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."

TABLE DESCRIPTION

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

Component Type

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. The component type of "External Surfaces" is provided in the Table 2 for each mechanical system. This Table 2 component type does not appear in the LRA Section 2 tables since it does not represent a specific component. It is utilized to provide clear identification of the materials that make up the external surfaces for all of the mechanical components within a system and how they are being managed for aging, as applicable. Intended Function

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.

Material

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 heat, radiation, or moisture in the presence of oxygen	An adverse localized environment is a condition in a limited plant area that is significantly more servere than the specified service conditions for the electrical equipment. This is one of the environments identified for Fuse Holder insulating materials.		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, cyclic loading	The exposure of a component in an air environment to periodic loading and unloading of stresses. This applies specifically to bellows.	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

TABLE 3.0-1 ENVIRONMENTS			
ENVIRONMENT	**DESCRIPTION**	**INTERNAL**	**EXTERNAL**
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 ≥ 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
Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	This environment applies to pressure retaining bolting (bolts and studs) in fluid systems with temperatures ≥ 212°F. Leakage of the fluid from the bolted joint is assumed.		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
Disodium/Trisodium Phosphate Solution	This environment consists of a solution of disodium and trisodium phosphate in demineralized water.	X	
Exhaust	This environment applies to components exposed to hot diesel engine exhaust gasses containing moisture and particulates.	X	

TABLE 3.0-1
ENVIRONMENTS

ENVIRONMENT	DESCRIPTION	INTERNAL	EXTERNAL
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	
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	
Service Water Chemical Treatment	This environment consists of demineralized carrier water with periodic injections of sodium hypochlorite, sodium bromide and sodium bisulfite.	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

TABLE 3.0-1
ENVIRONMENTS

ENVIRONMENT	DESCRIPTION	INTERNAL	EXTERNAL
Soil, Undisturbed	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	
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, Oxygenated	Low temperature treated water[1], in which oxygen is uncontrolled, such as spent fuel pool or spent fuel pool cooling systems.		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	

[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 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.
Loosening of Bolted Connections	A decrease in bolting tightness as applied to bolted electrical connections for the switchyard bus and transmission conductor connections.
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 Sealing	The loss of the seal provided by a seal or gasket. Applies to seals and gaskets.
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)
- 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 with Thermal Fatigue
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid
- 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
- Cumulative Fatigue Damage
- 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 CRDRL Nozzle Program
- BWR Feedwater Nozzle Program
- BWR Penetrations Program
- BWR Stress Corrosion Cracking Program
- BWR Vessel ID Attachment Welds Program
- BWR Vessel Internals Program
- Flow-Accelerated Corrosion 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 Effects Requiring Management

The following aging effects, associated with the NMP1 Reactor Pressure Vessel Internals, require management:

- Cracking
- Cumulative Fatigue Damage
- Loss of Fracture Toughness

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Reactor Pressure Vessel Internals components:

- BWR Vessel Internals 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:

- Carbon or Low Alloy Steel(Yield Strength < 100 Ksi)
- 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:

- Air
- 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
- Cumulative Fatigue Damage
- Loss of Material
- Loss of Preload

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
- Bolting Integrity 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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- 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:

- Air
- 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
- Cumulative Fatigue Damage
- Loss of Fracture Toughness
- Loss of Material
- Loss of Preload

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
- Bolting Integrity Program
- BWR Stress Corrosion Cracking Program
- One-Time Inspection Program
- Systems Walkdown 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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)

- 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:

- Air
- Treated Water, temperature < 140°F
- Treated Water, temperature ≥ 140°F, but < 212°F
- Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow
- Treated Water, temperature < 140°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Control Rod Drive System, require management:

- Cracking
- Cumulative Fatigue Damage
- 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)
- 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, Leaking Fluid
- 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
- Cumulative Fatigue Damage
- 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 CRDRL Nozzle Program
- BWR Feedwater Nozzle Program
- BWR Penetrations Program
- BWR Stress Corrosion Cracking Program
- BWR Vessel ID Attachment Welds Program
- BWR Vessel Internals Program
- Flow-Accelerated Corrosion Program
- One Time Inspection Program
- Reactor Head Closure Studs Program
- Reactor Vessel Surveillance 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)
- 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
- Cumulative Fatigue Damage

- Loss of Fracture Toughness

Aging Management Programs

The following aging management programs manage the aging effect for the NMP2 Reactor Pressure Vessel Internals components:

- BWR Vessel Internals 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)
- 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
- 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
- Cumulative Fatigue Damage
- Loss of Material
- Loss of Preload

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
- Bolting Integrity 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:

- 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
- 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 Reactor Recirculation System, require management:

- Cracking
- Cumulative Fatigue Damage
- Loss of Fracture Toughness
- Loss of Material
- Loss of Preload

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
- Bolting Integrity Program
- BWR Stress Corrosion Cracking Program
- One-Time Inspection 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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- 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
- 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
- Cumulative Fatigue Damage
- 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
- One-Time Inspection Program
- Systems Walkdown 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. Fatigue is addressed as a TLAA in Section 4.3. Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Condensing pots • Control Rod Drive (CRD) Assemblies • Control Rod Drive Return Line nozzle thermal sleeves • 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: • Steam Dryers • Main 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
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	NMP1 is consistent with NUREG-1801 with the exception that eddy current testing of the tubes cannot be performed due to all welded fabrication of the condenser, i.e., there is no access to the condenser tubes. Continuous radioactivity monitoring of the condenser vent is provided in the Control Room. Temperature monitoring is conducted by a Preventive Maintenance Program (B2.1.32) procedure.
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 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.
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 since it has no jet pumps.

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-09	Isolation Condenser	Crack initiation and growth due to SCC or cyclic loading	Inservice inspection; water chemistry	Yes, plant specific	NMP1 is consistent with NUREG-1801 with the exception that eddy current testing of the tubes cannot be readily performed due to all welded fabrication of the condenser, i.e., there is no access to the condenser tubes. Continuous radioactivity monitoring of the condenser vent is provided in the Control Room. Temperature monitoring is conducted by a Preventive Maintenance Program (B2.1.32) procedure. 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				
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	Consistent with NUREG-1801 with exceptions (see Section B2.1.3). The Reactor Head Closure Studs Program (Section B2.1.3) is credited for Closure Head Studs and Nuts that have an aging effect/mechanism of loss of material due to general corrosion.
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. NUREG-1801 items that identify FAC as a mechanism are IV.C1.1-a (main steam piping and fittings), IV.C1.1-c (feedwater piping and fittings), and IV.C1.3-a (carbon steel valves). These items are credited in Steam and Power Conversion Systems Tables 3.4.2.A-2 and 3.4.2.A-4. 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 exception: • Not applicable for pressurizer bolting 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-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	For feedwater nozzles, NMP1 manages aging under a program that is consistent with NUREG-1801, Program XI.M5, Feedwater Nozzle, as described in LRA Section B2.1.5. Program X1.M5 is also credited with managing cracking of feedwater nozzle thermal sleeves due to SCC. Verification of the absence of nozzle cracking provides proof that the thermal sleeve intended function is not degraded. For CRD return line nozzles, NMP1 manages aging under a program that is consistent with NUREG-1801, Program XI.M6, "BWR Control Rod Drive Return Line Nozzle," as described in LRA Section B2.1.37. Program X1.M6 is also credited with managing cracking of CRD return line nozzle thermal sleeves due to SCC. Verification of the absence of nozzle cracking provides proof that the thermal sleeve intended function is not degraded.
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).

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	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: • Core Differential Pressure nozzle safe end • Emergency Condenser Steam nozzle safe ends • Flow elements • Instrumentation penetrations • Reactor Recirculation nozzle safe ends • Safety Valve nozzle safe ends
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). Aging management of the CRD stub tube penetrations is managed in accordance with BWRVIP-47 of the BWR Vessel Internals Program, XI.M9, and plant-specific commitments contained in the NRC safety evaluation dated March 25, 1987.

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 • Liquid Poison Spray Line and Sparger • 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.
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	This item is not applicable for the jet pump components since NMP1 does not have jet pumps. Aging management of the orificed fuel supports is conducted in accordance with BWRVIP-47 of the BWR Vessel Internals Program, XI.M9.

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-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. Fatigue is addressed as a TLAA 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, Main 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 Accumulators • 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 Reactor Vessel Instrumentation, Reactor Recirculation, and CRD Systems 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	For NMP2, the jet pump sensing lines are not within scope of license renewal. The vessel flange leak detection lines are comprised of both stainless steel and carbon steel components. The design internal environment for these lines is air. They contain water only during refueling operations and undergo an ASME pressure test following refueling. These lines are managed by the ASME Section XI, One-Time Inspection and System Walkdown programs. The carbon steel line sections are managed for loss of material instead of cracking.
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	Consistent with NUREG-1801. NMP2 credits 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 and SCC.
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. NUREG-1801 items that identify FAC as a mechanism are IV.C1.1-a (main steam piping and fittings), IV.C1.1-c (feedwater piping and fittings), and IV.C1.3-a (carbon steel valves). These items are credited in Steam and Power Conversion Systems Tables 3.4.2.B-3 and 3.4.2.B-4. 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:. • Not applicable for 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	For feedwater nozzles, NMP2 manages aging under a program that is consistent with NUREG-1801, Program XI.M5, Feedwater Nozzle, as described in LRA Section B2.1.5. Program X1.M5 is also credited with managing cracking of feedwater nozzle thermal sleeves due to SCC. Verification of the absence of nozzle cracking provides proof that the thermal sleeve intended function is not degraded. For CRD return line nozzles, NMP2 manages aging under a program that is consistent with NUREG-1801, Program XI.M6, "BWR Control Rod Drive Return Line Nozzle," as described in LRA Section B2.1.37. Program X1.M6 is also credited with managing cracking of CRD return line nozzle thermal sleeves due to SCC. Verification of the absence of nozzle cracking provides proof that the thermal sleeve intended function is not degraded.

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-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.
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, Jet Pump and Reactor Recirculation nozzle safe ends • Feedwater nozzle safe end inserts • Main Steam condensing chambers and restriction orifices (see Table 3.4.2.B-3) • N4D Feedwater nozzle safe end weld overlays
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 • Core Spray and Feedwater nozzle thermal sleeves and extensions • Residual Heat Removal nozzle thermal sleeves
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.

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-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	The jet pumps and this aging effect are managed by BWRVIP-41 of the BWR Vessel Internals Program, XI.M9. Aging management of the orificed fuel supports is conducted in accordance with BWRVIP-47 of the BWR Vessel Internals Program, XI.M9.
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	Consistent with BWRVIP-74-A, Table 3-1, "BWR RPV Aging Mechanism Assessment Summary." Additionally, consistent with NUREG-1801, the unclad top head and RPV nozzles are also being managed for loss of material by the ASME Inservice Inspection and Water Chemistry Programs; therefore, credit will be taken for implementation of the NUREG-1801 guidance.
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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.3-a	3.1.1.A-01	C, 1
						IV.A1.3-d	3.1.1.A-01	A
				Cracking	BWR Feedwater Nozzle Program	IV.A1.3-b	3.1.1.A-27	A
					BWR CRDRL Nozzle Program	IV.A1.3-c	3.1.1.A-27	E
Nozzle Safe Ends	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.3-a	3.1.1.A-01	C, 2
		Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR Stress Corrosion Cracking Program	IV.A1.4-a	3.1.1.A-29	B
					Water Chemistry Control Program			D, 3
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.4-b	3.1.1.A-01	A
								C, 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 3.1.2.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: • Core Differential Pressure • CRD Stub Tube • Flux Monitor • Instrumentation • Vessel Drain	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, high Temperature – BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.3-a	3.1.1.A-01	C, 54
				Loss of Material	Flow-Accelerated Corrosion Program			H
		Nickel Based Alloys; 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.A-30	B
					BWR Vessel Internals Program	IV.A1.5-a	3.1.1.A-30	E
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.5-b	3.1.1.A-01	A
Penetrations (cont'd)	PB (cont'd)	Nickel Based Alloys; Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel (cont'd)	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.A1.4-a	3.1.1.A-29	D, 5
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.4-b	3.1.1.A-01	C, 5
						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)	Air with Thermal Fatigue	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			H
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.7-a	3.1.1.A-01	A
Thermal Sleeves	SFS	Nickel Based Alloys	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.B1.4-b	3.1.1.A-01	C, 6
				Cracking	BWR Feedwater Nozzle Program Water Chemistry Control Program	IV.A1.4-a	3.1.1.A-27	E, 6
		Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR CRDRL Nozzle Program Water Chemistry Control Program	IV.A1.4-a	3.1.1.A-27	E, 58
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.4-b	3.1.1.A-01	C, 58

See Table 2.0-1 for 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 (cont'd)	SFS (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.B1.4-b	3.1.1.A-01	C, 60
				Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.4-a	3.1.1.A-31	B, 60
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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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, Leaking Fluid	Cracking	Reactor Head Closure Studs Program	IV.A1.1-c	3.1.1.A-22	B
				Loss of Material	Reactor Head Closure Studs Program			H
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			H
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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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)	LBS SIA	Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.1-b	3.1.1.A-01	C, 9
Top Head (Leak Detection Lines) (cont'd)	LBS SIA (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel (cont'd)	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.A1.4-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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.3-d	3.1.1.A-01	C, 10
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	IV.A1.1-a	3.1.1.A-34	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
Valves	LBS SIA	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 One Time Inspection Program Water Chemistry Control Program	IV.A1.1-d	3.1.1.A-08	C
	PB PR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.2-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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 Water Chemistry Control Program	IV.A1.2-e	3.1.1.A-28	B
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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-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) (cont'd)	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.B1.5-b	3.1.1.A-01	C, 12
				Cracking	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.B1.1-c	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-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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.B1.3-b	3.1.1.A-01	A
In-core 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

See Table 2.0-1 for 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
Liquid Poison Spray Line and Sparger	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	D
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	Loss of Fracture Toughness	BWR Vessel Internals Program	IV.B1.5-a	3.1.1.A-33	E
Steam Dryer Assembly	NSS	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.B1.1-c	3.1.1.A-01	C, 17
				Cracking	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 $\geq 5x10^{20}$ 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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.B1.2-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-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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-g	3.1.1.A-01	A
				Loss of Material	Bolting Integrity Program	IV.C1.3-e	3.1.1.A-26	E
				Loss of Preload	Bolting Integrity Program	IV.C1.3-f	3.1.1.A-26	E
Condensing Pots	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.A-01	C, 18
				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, 18
External Surfaces	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.A-05	A
		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 3.1.2.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	Air	None	None			None
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	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
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D

See Table 2.0-1 for 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 (cont'd)	PB (cont'd)	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, 19
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.2-f	3.1.1.A-01	A
						IV.C1.3-g	3.1.1.A-01	A
				Loss of Material	Bolting Integrity Program	IV.C1.2-d	3.1.1.A-26	A
						IV.C1.3-e	3.1.1.A-26	A
				Loss of Preload	Bolting Integrity Program	IV.C1.2-e	3.1.1.A-26	A
						IV.C1.3-f	3.1.1.A-26	A
External Surfaces	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.A-05	A
		Cast Austenitic Stainless Steel	Air	None	None			None
	LBS PB SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.A-01	C, 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 3.1.2.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	LBS SIA	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	B
	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.A-01	A
				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

See Table 2.0-1 for 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
Pumps	PB	Cast Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.2-a	3.1.1.A-01	A
				Cracking	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
Pump Seal Flanges	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	Bolting Integrity Program	IV.C1.2-d	3.1.1.A-26	A
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 or Steam, temperature ≥ 482°F	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.A-29	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 (cont'd)	Cast Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F (cont'd)	Cracking (cont'd)	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 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

See Table 2.0-1 for 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 (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F (cont'd)	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-d	3.1.1.A-01	A
	PB LBS SIA	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, 49
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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)	Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-a	3.4.1.A-02	B
		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, 50
Closure Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-g	3.1.1.A-01	A
				Loss of Material	Bolting Integrity Program	IV.C1.3-e	3.1.1.A-26	E
				Loss of Preload	Bolting Integrity Program	IV.C1.3-f	3.1.1.A-26	E
External Surfaces	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.A-05	A
		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 3.1.2.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
External Surfaces (cont'd)	LBS PB SIA (cont'd)	Cast Austenitic Stainless Steel	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
Filters	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-a	3.4.1.A-02	D
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
	FLT 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, 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.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 (cont'd)	Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow (cont'd)	Cracking (cont'd)	One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 23
Heat Exchangers	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E4-a	3.4.1.A-02	B
Piping and Fittings	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature ≥ 140°F, but < 212°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, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.1-b	3.4.1.A-02	B
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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

See Table 2.0-1 for 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 (cont'd)	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
Pumps	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.3-a	3.4.1.A-02	B
Tank	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-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 3.1.2.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	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	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, but < 212°F	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, temperature ≥ 140°F; but < 212°F	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 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 (cont'd)	LBS SIA	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, 49
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
	PB	Cast Austenitic Stainless Steel	Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 24
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	Selective Leaching of Materials 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
Valves (cont'd)	PB (cont'd)	Wrought Austenitic Stainless Steel	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
			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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.6-a	3.1.1.B-01	A
Nozzles	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.3-d	3.1.1.B-01	C, 26
				Cracking	BWR Feedwater Nozzle Program	IV.A1.3-b	3.1.1.B-27	A
					BWR CRDRL Nozzle Program	IV.A1.3-c	3.1.1.B-27	A
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, High temperature, Neutron Fluence ≥ $1x10^{17} n/cm^2$. – BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV-A1.3-d	3.1.1.B-01	C
				Loss of Fracture Toughness	Reactor Vessel Surveillance Program			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 3.1.2.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	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.3-a	3.1.1.B-01	C, 27
						IV.A1.3-d	3.1.1.B-01	C, 28
		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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.A1.4-a	3.1.1.B-29	B, 30
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	SFS	Nickel Based Alloys	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.A1.4-a	3.1.1.B-31	E, 31
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.4-b	3.1.1.B-01	C, 31
		Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.A1.4-a	3.1.1.B-31	D, 59, 67
					BWR Feedwater Nozzle Program Water Chemistry Control Program	IV.A1.4-a	3.1.1.B-27	D, 6
					BWR CRDRL Nozzle Program Water Chemistry Control Program	IV.A1.4-a	3.1.1.B-27	D, 58
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.4-b	3.1.1.B-01	C, 6, 58 59, 67

See Table 2.0-1 for 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
Penetrations: • Core Differential Pressure and Liquid Control • CRD Stub Tubes • Drain Lines • In-core Instruments • Instrumentation	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.3-d	3.1.1.B-01	C, 5
				Loss of Material	Flow-Accelerated Corrosion Program			H
		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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.5-b	3.1.1.B-01	A
Support Skirt	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air With Thermal Fatigue	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.7-a	3.1.1.B-01	A
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) 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-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 and Nozzles (unclad)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.1-b	3.1.1.B-01	C, 8, 33
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	IV.A1.1-a	3.1.1.B-34	B
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, Leaking Fluid	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)		3.1.1.B-01	H
				Loss of Material	Reactor Head Closure Studs Program			H
				Cracking	Reactor Head Closure Studs Program	IV.A.1.1-c	3.11.B-22	A
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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.1-b	3.1.1.B-01	C, 9
				Loss of Material	Water Chemistry Control Program One Time Inspection Program			F
		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 One-Time Inspection Program Water Chemistry Control Progam	IV.1.1-d	3.1.1.B-08	B
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.1-b	3.1.1.B-01	C, 9
				Loss of Material	One Time Inspection Program Water Chemistry Control Progam			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 3.1.2.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
Valves (cont'd)	PB (cont'd)	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 One-Time Inspection Program Water Chemistry Control Progam	IV.A1.1-d	3.1.1.B-08	B
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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.4-b	3.1.1.B-01	C, 34
	PB SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, High temperature, Neutron Fluence ≥ $1x10^{17} n/cm^2$. – BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.2-b	3.1.1.B-01	A
	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.2-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 (cont'd)	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
					BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.A1.4-a	3.1.1.B-29	B, 69
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.4-b	3.1.1.B-01	C, 11
		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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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.	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.B1.5-b	3.1.1.B-01	C, 36
				Cracking	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	Loss of Fracture Toughness	BWR Vessel Internals Program	IV.B1-4c	3.1.1.B-33	E
		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
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

See Table 2.0-1 for 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 Head Bolts	SFS	Nickel Based Alloys	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			F
				Cracking	BWR Vessel Internals Program Water Chemistry Control 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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 ≥ $1x10^{17}$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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			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
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

See Table 2.0-1 for 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 (cont'd)	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
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
In-core 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

See Table 2.0-1 for 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
In-core 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
Jet Pump Assemblies	DF	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, 62
		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, 63
	DF SFS	Cast Austenitic Stainless Steel	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.B1.4-b	3.1.1.B-01	A, 61
				Loss of Fracture Toughness	BWR Vessel Internals Program	IV.B1.4-c	3.1.1.B-33	E, 61

See Table 2.0-1 for 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, 64
		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, 65
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.B1.4-b	3.1.1.B-01	A, 65
			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, 66
					BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.4-a	3.1.1.B-31	B, 67

See Table 2.0-1 for 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
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	Loss of Fracture Toughness	BWR Vessel Internals Program	IV.B1.5-a	3.1.1.B-33	E
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

See Table 2.0-1 for 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
Spray Nozzles	DF PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.A1.3-d	3.1.1.B-01	C, 42
Steam Dryer	NSS	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-g	3.1.1.B-01	A
				Loss of Material	Bolting Integrity Program	IV.C1.3-e	3.1.1.B-26	A
				Loss of Preload	Bolting integrity Program	IV.C1.3-f	3.1.1.B-26	A
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-g	3.1.1.B-01	A
				Cracking	Bolting Integrity Program			H, 43
				Loss of Material	Bolting Integrity Program			H
				Loss of Preload	Bolting Integrity Program	IV.C1.3-f	3.1.1.B-26	H
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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	C, 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
External Surfaces	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.A-05	A
	PB	Nickel Based Alloys	Air	None	None			None
	PB SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program			H
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	C, 48
		Nickel Based Alloys	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 (cont'd)	Nickel Based Alloys (cont'd)	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	A
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			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 (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F, Low Flow (cont'd)	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	A
	SIA	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	A
Radiation Collars	RD	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 3.1.2.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
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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	A
Vacuum Breakers	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D

See Table 2.0-1 for 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
Valves	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	E, 24
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.2-f	3.1.1.B-01	A
						IV.C1.3-g	3.1.1.B-01	A
				Loss of Material	Bolting Integrity Program	IV.C1.2-d	3.1.1.B-26	A
						IV.C1.3-e	3.1.1.B-26	A
				Loss of Preload	Bolting Integrity Program	IV.C1.2-e	3.1.1.A-26	A
						IV.C1.3-f	3.1.1.A-26	A
		Wrought Austenitic Stainless Steel	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			F
				Loss of Preload	Bolting Integrity Program	IV.C1.2-e	3.1.1.A-26	H
External Surfaces	PB	Cast Austenitic Stainless Steel	Air	None	None			None
	PB	Nickel Based Alloys	Air	None	None			None
	LBS PB SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
Piping and Fittings	LBS PB SIA	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D

See Table 2.0-1 for 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)	LBS PB SIA (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			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
			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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 3.1.2.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)	LBS PB SIA (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	A
	LBS SIA	Wrought Austenitic Stainless Steel	Hydraulic Fluid	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.B-07	B
	PB	Nickel Based Alloys	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-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 (cont'd)	Nickel Based Alloys (cont'd)	Treated Water, temperature ≥ 140°F, but < 212°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			F
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	A
		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.B-29	B
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 3.1.2.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	PB	Cast Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.2-a	3.1.1.B-01	A
				Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.C1.2-b	3.1.1.B-29	B
			Treated Water or Steam, temperature ≥ 482°F (cont'd)	Loss of Fracture Toughness	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.C1.2-c	3.1.1.B-23	B
		Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.2-a	3.1.1.B-01	A
				Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.C1.2-b	3.1.1.B-29	B
Radiation Collars	RD	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 3.1.2.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	FC PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			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
			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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 3.1.2.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
Seal Coolers	HT PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	One-Time Inspection Program Water Chemistry Control Program			H
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.2-a	3.1.1.B-01	C
Valves	LBS PB SIA	Wrought Austenitic Stainless Steel	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	D
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	E, 24
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	E, 24
			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	D

See Table 2.0-1 for 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)	LBS PB SIA (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	E, 24
			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
	LBS SIA	Wrought Austenitic Stainless Steel	Hydraulic Fluid	None	None			None
	PB	Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-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.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 (cont'd)	Cast Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F	Cracking	BWR Stress Corrosion Cracking Water Chemistry Control Program	IV.C1.3-c	3.1.1.B-29	B
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-d	3.1.1.B-01	A
				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 or Steam, temperature ≥ 482°F	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.B-29	B
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-d	3.1.1.B-01	A
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	E, 24
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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)	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	One-Time Inspection Program Water Chemistry Control Program			H
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	C
Closure Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-g	3.1.1.B-01	A
				Loss of Material	Bolting Integrity Program	IV.C1.3-e	3.1.1.B-26	E
				Loss of Preload	Bolting Integrity Program	IV.C1.3-f	3.1.1.B-26	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 3.1.2.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)	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	One-Time Inspection Program Water Chemistry Control Program			H
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	C, 57
External Surfaces	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.A-05	A
	PB	Cast Austenitic Stainless Steel	Air	None	None			None
	LBS PB SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
	PB	Copper Alloys (Zinc ≤ 15%)	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 3.1.2.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	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-a	3.4.1.B-02	D
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
Flow Elements	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
Flow Indicators	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
Flow Orifices	FC LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D

See Table 2.0-1 for 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	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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.A-02	B, 22
			Treated Water, temperature < 140°F, Low Flow (cont'd)	Loss of Material (cont'd)	One-Time Inspection Program Water Chemistry Control Program	VIII.E.1-b	3.4.1.A-02	B, 24
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.1.2.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)	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, 22
					One-Time Inspection Program Water Chemistry Control Program			H
					One-Time Inspection Program Water Chemistry Control Program			H, 24
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	A
		Copper Alloys (Zinc ≤ 15%)	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 3.1.2.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 (cont'd)	Wrought Austenitic Stainless Steel	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	A
Pumps	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.3-a	3.4.1.B-02	B
Rupture Discs	PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Valves	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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,
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
Valves (cont'd)	LBS PB SIA (cont'd)	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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, 24
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			H
		Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D

See Table 2.0-1 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.

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.

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

2. Feedwater nozzle safe ends and Steam nozzle safe ends are not identified in NUREG-1801 for this GALL row number.

3. Core Differential Pressure nozzle safe ends, Emergency Condenser Steam nozzle safe ends, Reactor Recirculation nozzle safe ends, and Safety Valve 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 nozzle thermal sleeves are not identified in NUREG-1801 for this GALL row number.

7. Not used.

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 and collars 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.

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

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 end extensions and Main Steam nozzle safe end are not identified in NUREG-1801 for this GALL row number.

28. CRD Return Line nozzle safe ends, Residual Heat Removal nozzle safe end extensions, 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 end inserts, 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.

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

31. Core Spray nozzle thermal sleeve extensions 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.

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

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.
58. This line item applies to Control Rod Drive Return Line nozzle thermal sleeves.
59. Core Spray nozzle thermal sleeves and Residual Heat Removal thermal sleeves are not identified in NUREG-1801 for this GALL row number.
60. This line applies to Core Spray Nozzle thermal sleeves.
61. This line applies to the following Jet Pump subcomponents: diffuser collars, inlet mixers, and jet pump nozzles.
62. This line applies to the following Jet Pump subcomponents: diffuser adaptors.
63. This line applies to the following Jet Pump subcomponents: riser pipes and diffuser shells.

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

64. This line applies to the following Jet Pump subcomponents: riser restrainer brackets and restrainer wedges.

65. This line applies to the following Jet Pump subcomponents: beams.

66. This line applies to the following Jet Pump subcomponents: riser braces and bolts.

67. This line applies to the Recirculation Inlet Nozzle thermal sleeves (Jet Pump thermal sleeves).

68. This line applies to the Control Rod Drive Return Line nozzle thermal sleeves.

69. This line item refers to the N4D Feedwater nozzle safe end weld overlay. Feedwater nozzle safe end weld overlays are not specifically included in NUREG-1801 for this item number.

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

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)
- 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
- Demineralized Untreated Water, Low Flow
- Raw Water
- Raw Water, Low Flow
- Treated Water, temperature < 140°F, Low Flow

Aging Effect Requiring Management

The following aging effect, associated with the NMP1 Containment Spray System, requires management:

- 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
- Bolting Integrity Program
- One-Time Inspection Program
- Open-Cycle Cooling Water System Program

- Preventive Maintenance 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)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Glass
- 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
- Cumulative Fatigue Damage
- 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
- Bolting Integrity Program
- BWR Stress Corrosion Cracking 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

- Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Glass
- 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
- Air with Moisture or Wetting, temperature ≥ 140°F
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid
- 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
- Cumulative Fatigue Damage
- 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
- Bolting Integrity Program
- BWR Stress Corrosion Cracking 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)

- 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
- 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

<u>Aging Management Programs</u>

The following <u>aging management programs</u> manage the aging effect for the NMP2 Hydrogen Recombiner System components:

- <u>Bolting Integrity Program</u>
- <u>One-Time Inspection Program</u>
- <u>Systems Walkdown Program</u>

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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)

- 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
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid
- 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
- Cumulative Fatigue Damage
- Loss of Material

<u>Aging Management Programs</u>

The following <u>aging management programs</u> manage the aging effects for the NMP2 High Pressure Core Spray System components:

- <u>Bolting Integrity Program</u>
- <u>One-Time Inspection Program</u>

- Systems Walkdown Program
- Water Chemistry Control Program

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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- 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
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid
- 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
- Cumulative Fatigue Damage
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Low Pressure Core Spray System components:

- Bolting Integrity 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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- 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
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid
- 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
- Cumulative Fatigue Damage
- 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

- Bolting Integrity 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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- 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
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid
- Raw Water, Low Flow
- 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 ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Residual Heat Removal System, require management:

- Cracking
- Cumulative Fatigue Damage
- 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
- Bolting Integrity Program
- Flow Accelerated Corrosion 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:

- Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels
- 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
- Dried Air or Gas

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Standby Gas Treatment System, requires management:

- Loss of Material

<u>Aging Management Programs</u>

The following <u>aging management programs</u> manage the aging effect for the NMP2 Standby Gas Treatment System components:

- <u>Bolting Integrity Program</u>

- 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-1801

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). 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.A NMP1 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.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 • ERV discharge Y-quenchers • Filters/strainers • Flow elements • Flow orifices • Heat exchangers • NSR piping, fittings and valves in NMP1 ESF Systems • 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-1801

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 B2.1.10 (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). 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.A NMP1 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.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: • ERV Discharge Y-quenchers • Filters/strainers • Flow elements • Heat exchangers • NSR piping, fittings and valves in NMP1 ESF Systems • 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 B2.1.10 (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-1801

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-1801

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-1801

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				
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 B2.12 and B2.1.6). 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-1801

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	Consistent with NUREG-1801.

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 • Rupture Discs • 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 B2.1.2 (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-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). 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), 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-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 • Piping and Fittings • SRV T-quenchers • Valves Further evaluation is documented in Appendix B2.1.2 (Water Chemistry Program) and 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 the Closed Cycle Cooling Water 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-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				
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 B2.1.2 and B2.1.6). 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.

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-17	PWR only				
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	Consistent with NUREG-1801.

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 SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	V.E.1-b	3.2.1.A-10	A,22
		Wrought Austenitic Stainless Steel	Air	None	None			None
External Surfaces	PB SIA	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	A, 4
	PB	Cast Austenitic Stainless Steel	Air	None	None			None
		Cooper Alloys (Zinc ≤ 15%)	Air	None	None			None
		Cooper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None
		Grey Cast Iron	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.A-10	F, 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 3.2.2.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	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
						V.D2.5-a	3.2.1.A-03	C, 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
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water, 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	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII. E.5-b	3.4.1.A-02	D
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
		Wrought Austenitic Stainless Steel	Raw Water, Low Flow	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	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-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 Orifices	FCPB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.5-a	3.2.1.A-03	A
					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)	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.5-a	3.2.1.A-03	A
Heat Exchangers	HT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	Preventive Maintenance Program	V.D2.1-e	3.2.1.A-03 3.1.2.A-05	C, 3
		Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	Preventive Maintenance Program	V.D2.1-e	3.2.1.A-05	C, 3
Nozzles	SPR	Cast Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	Preventive Maintenance Program	V.D2.1-e	3.2.1.A-05	A, 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)	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.5-a	3.2.1.A-03	A
			Raw Water	Loss of Material	Open Cycle Cooling Water System Program	VII.C1.1-a	3.3.1.A-17	A
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	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.A-02 3.2.1.A-04	B, 5
	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air with Moisture or Wetting, temperature < 140 F	Loss of Material	One-Time Inspection Program	V.D2.5-a	3.2.1.A-03	C
Pumps	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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

See Table 2.0-1 for 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 (cont'd)	PB (cont'd)	Gray Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program	VII.C1.5-a	3.3.1.A-29	A
			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
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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

See Table 2.0-1 for 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 (cont'd)	Copper Alloys (Zinc ≤ 15%)	Air with Moisture or Wetting, temperature < 140°F	None	None			None
			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

See Table 2.0-1 for 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 (cont'd)	Wrought Austenitic Stainless Steel	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	VIII.E.5-b	3.4.1.A-02	D
	SIA	Carbon or Low Alloy Steel(Yield Strength< 100 Ksi)	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

See Table 2.0-1 for 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
Accumulator	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Lubricating Oil	None	None			None
Bolting	PB LBS SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	V.E.1-b	3.2.1.A-10	A, 22
		Wrought Austenitic Stainless Steel	Air	None	None			None
External Surfaces	PB LBS SIA	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	A, 4
		Wrought Austenitic Stainless Steel	Air	None	None			None
	PB	Cast Austenitic Stainless Steel	Air	None	None			None
		Cooper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None
		Glass	Air	None	None			None
		Grey Cast Iron	Air	Loss of Material	Systems Walkdown Programs	V.E.1-b	3.2.1.A-10	F, 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.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
Filters/Strainers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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			H
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
Flow Orifices	FCPB	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, 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			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 3.2.2.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 (cont'd)	FCPB (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water, Temperature ≥ 140°F, but < 212°F, Low Flow (cont'd)	Cracking (cont'd)	One-Time Inspection Program Water Chemistry Control Program			H
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
Level Gauges	SIA	Glass	Lubricating Oil	None	None			None
Piping and Fittings	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, Temperature < 140°F, Low Flow	Loss of Material	Water Chemistry Program One-Time Inspection 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-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 (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	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 3.2.1.A-04	B
		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	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	V.D2.1-c	3.2.1.A-16	B
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
			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 3.2.2.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 (cont'd)	SIA (cont'd)	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
Pumps	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.A-04	B
Pumps (cont'd)	PB (cont'd)	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

See Table 2.0-1 for 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	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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-03 3.2.1.A-05	E
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
			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 3.2.1.A-04	B
		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.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 (cont'd)	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, 5, 6
			Treated Water, Temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	V.D2.3-c	3.2.1.A-16	B
			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 (cont'd)	Cast Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
			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	IV.C1.1-i	3.1.1.A-07	D, 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.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 (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	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
		Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.A-01	C, 6
	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
			Lubricating Oil	None	None			None
		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-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 LBS SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cracking	Bolting Integrity Program	V.E.2-b	3.2.1.A-18	A
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			G
				Loss of Material	Bolting Integrity Program	V.E.2-a	3.2.1.A-18	A
			Air	Loss of Material	Bolting Integrity Program	V.E.2-a	3.2.1.A-18	B
External Surfaces	PB LBS SIA	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	A, 4
		Wrought Austenitic Stainless Steel	Air	None	None			None
	PB	Aluminum alloys containing cooper or zinc as the primary alloying elements	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 3.2.2.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
External Surfaces (cont'd)	PB Cont'd)	Aluminum, and Aluminum Alloyed with Manganese, Magnesium, and Magnesium plus Silicon	Air	None	None			None
		Cast Austenitic Stainless Steel	Air	None	None			None
		Glass	Air	None	None			None
Heat Exchangers	HT PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Preventive Maintenance Program Water Chemistry Control Program	IV.C1.4-a,b	3.1.1.A-09	B, 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 3.2.2.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)	HT PB (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F	Cracking Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Preventive Maintenance Program Water Chemistry Control Program	IV.C1.4-a,b	3.1.1.A-09	B, 16
			Air with Moisture or Wetting, temperature ≥ 140°F	Cracking Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program 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)	HT PB (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water, Temperature ≥ 140°F, but < 212°F	Cracking Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC and IWD) Program Preventive Maintenance Program Water Chemistry Control Program	IV.C1.4-a,b	3.1.1.A-09	B, 16
	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking Loss of Material	ASME Section XI Inxervice Inspection (Subsections IWB, IWC and IWD) Program Preventive Maintenance Program Water Chemistry Control Program	IV.C1.4-a,b	3.1.1.A-09	B, 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 3.2.2.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 or Steam, temperature ≥ 482°F	Cracking Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC and IWD) Preventive Maintenance Program Water Chemistry Control Program	IV.C1.4-a,b	3.1.1.A-09	B, 16
Level Gauges	PB	Glass	Treated Water, temperature < 140°F, Low Flow	None	None			None
Piping and Fittings	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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.A-02 3.2.1.A-04	B
			Treated Water or Steam, Temperature > 212°F but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	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
Piping and Fittings (cont'd)	LBS SIA (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	Treated Water or Steam, Temperature > 212°F but < 482°F	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
		Wrought Austenitic Stainless Steel	Treated Water, Temperature < 140°F, Low Flow	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			Treated Water or Steam, Temperature > 212°F but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.A-01	A
			Treated Water or Steam, Temperature > 212°F but < 482°F	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	V.D2.1-c	3.2.1.A-16	B
					One-Time Inspection Program	V.D2.1-c	3.2.1.A-16	E
	PB PH	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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

See Table 2.0-1 for 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 PH (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.A-01	A
				Loss of Material	One Time Inspection Program Water Chemistry Control Program	V.D.2.1-a	3.2.1.A-02 3.2.1.A-04	B,
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			Treated Water, Temperature ≥ 140°F, but < 212°F	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	V.D2.1-c	3.2.1.A-16	B, 12

See Table 2.0-1 for 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 PH (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.A-01	A
				Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	V.D2.1-c	3.2.1.A-16	B
			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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.2.1.A-01	A
	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
		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

See Table 2.0-1 for 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	Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Treated Water, temperature < 140°F	None	None			None
Valves	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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-03 3.2.1.A-05	B
			Treated Water or Steam > 212°F but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
		Wrought Austenitic Stainless Steel	Treated Water, Temperature < 140°F, Low Flow	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			Treated Water or Steam > 212°F but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
Valves (cont'd)	LBS SIA (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam > 212°F but < 482°F	Cracking	Water Chemistry Control Program One-Time Inspection Program	IV.C1.1-i	3.1.1.A-07	D, 6
	PB PH	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
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
			Treated Water, temperature < 140°F	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

See Table 2.0-1 for 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 PH (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	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 3.2.1.4-04	B
			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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 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
Valves (cont'd)	PB PH (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.A-01	C, 6
			Treated Water or Steam, temperature ≥ 212°F, but < 482°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
			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

See Table 2.0-1 for 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 PH (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd) .	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	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.A-02 3.2.1.A-04	B
		Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D

See Table 2.0-1 for 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 PH (cont'd)	Cast Austenitic Stainless Steel (cont'd)	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
			Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.A-01	C, 6
				Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	V.D2.3-c	3.2.1.A-16	B
				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	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D

See Table 2.0-1 for 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 PH (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.A-01	C, 6
			Treated Water or Steam, temperature ≥ 482°F	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	V.D2.3-c	3.2.1.A-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 3.2.2.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 PH (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F (cont'd)	Cracking (cont'd)	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.A-01	C, 6
				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, 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 PH (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	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
	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
		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.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)	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 SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	V.E.1-b	3.2.1.B-10	A, 22
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
External Surfaces	PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.B-10	A, 4
		Cast Austenitic Stainless Steel	Air	None	None			None
	PB	Wrought Austenitic Stainless Steel	Air	None	None			None
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

See Table 2.0-1 for 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
Filters/Strainers (cont'd)	PB (cont'd)	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
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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, SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.B-03 3.2.1.B-05	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)	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
	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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-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 LBS SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	V.E.1-b	3.2.1.B-10	A, 22
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cracking	Bolting Integrity Program	V.E.2-b	3.2.1.B-18	A
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			G
				Loss of Material	Bolting Integrity Program	V.E.2-a	3.2.1.B-18	A
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
Bolting (cont'd)	PB	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cracking	Bolting Integrity Program			G
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			G
				Loss of Material	Bolting Integrity Program			G
External Surfaces	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	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
External Surfaces (cont'd)	LBS PB SIA (cont'd)	Wrought Austenitic Stainless Steel	Air	None	None			None
	PB	Cast Austenitic Stainless Steel	Air	None	None			None
		Nickel Based Alloys	Air	None	None			None
Filter/Strainers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	D, 2
Piping and Fittings	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-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.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)	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 3.2.1.B-04	B
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 3.2.1.B-04	B
		Nickel Based Alloys	Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			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 (cont'd)	Nickel Based Alloys (cont'd)	Treated Water or Steam, temperature ≥ 482°F, Low Flow (cont'd)	Cracking	One-Time Inspection Program Water Chemistry Control Program			F
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	A
				Cracking	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-c	3.2.1.B-16	E, 10
	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	B
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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)	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 3.2.1.B-04	B
		Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Restriction Orifices	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	C, 7
				Cracking	One-Time Inspection Program Water Chemistry Control Program			H
Valves	LBS SIA	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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)	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 3.2.1.B-04	B
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 3.2.1.B-04	B
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	C, 6
				Cracking	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	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cracking	Bolting Integrity Program	V.E.2-b	3.2.1.B-18	A
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			G
				Loss of Material	Bolting Integrity Program	V.E.2-a	3.2.1.B-18	B
			Air	Loss of Material	Bolting Integrity Program	V.E.2-a	3.2.1.B-18	B
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cracking	Bolting Integrity Program			G
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			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.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 (cont'd)	LBS PB SIA	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Loss of Material	Bolting Integrity Program			G
			Air	None	None			None
External Surfaces	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.B-10	A, 4
	PB	Cast Austenitic Stainless Steel	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
Filters/Strainers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	D, 1
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	D, 2
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Piping and Fittings	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	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 3.2.1.B-04	B
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-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.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 (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	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 3.2.1.B-04	B
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.12(c)	V.D2.1-b	3.2.1.B-01	A
			Treated Water or Steam, temperature ≥ 482°F, Low Flow (cont'd)	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02 3.2.1.B-04	B
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-a	3.4.1.B-02	D
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-a	3.4.1.B-02	D

See Table 2.0-1 for 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
Pumps	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	B
		Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Restriction Orifices	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
			Treated Water, Temperature ≥ 140°F, but < 212°F	Cracking	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 3.2.2.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 (cont'd)	PB (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	C, 7
				Cracking	One-Time Inspection Program Water Chemistry Control Program			H
Valves	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	B
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	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 3.2.1.B-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.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 (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 3.2.1.B-04	B
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-a	3.4.1.B-02	D
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-a	3.4.1.B-02	D
			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

See Table 2.0-1 for 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 (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	C, 6
				Cracking	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	PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	V.D2.5-a	3.2.1.B-03	C, 18
Bolting	PB LBS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air					
				Loss of Material	Bolting Integrity Program	V.E.1-b	3.2.1.B-10	A, 22
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cracking	Bolting Integrity Program	V.E.2-b	3.2.1.B-18	A
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			G
				Loss of Material	Bolting Integrity Program	V.E.2-a	3.2.1.B-18	A
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	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 3.2.2.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, Leaking Fluid	Cracking	Bolting Integrity Program			H
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			G
				Loss of Material	Bolting Integrity Program			G
Condensing Chambers	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
			Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	C, 17
Condensing Chambers	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	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 3.2.2.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)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
External Surfaces	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.B-10	A, 4
		Wrought Austenitic Stainless Steel	Air	None	None			None
	PB	Cast Austenitic Stainless Steel	Air	None	None			None
		Nickel Based Alloys	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 3.2.2.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
External Surfaces (cont'd)	PB SIA	Polymers	Air	Cracking	Preventive Maintenance Program			H
				Loss of Strength	Preventive Maintenance Program			H
Filters/Strainers	PB LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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)	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 3.2.1.B-04	D 1
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	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.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
Heat Exchangers	HT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Lubricating Oil	None	None			None
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Piping and Fittings	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	A
		Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.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 3.2.2.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	LBS SIA	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Water Chemistry Control Program One-Time Inspection Program	V.D2.1-c	3.2.1.B-16	E
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	B
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
	PB	Nickel Based Alloys	Treated Water, temperature < 140°F	None	None			None
			Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			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 (cont'd)	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	A
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F (cont'd)	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	V.D2.1-c	3.2.1.B-16	B
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	A
				Cracking	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 SIA	Polymers	Treated Water, temperature < 140°F	Cracking	Preventive Maintenance Program			F
				Loss of Strength	Preventive Maintenance Program			F
Pumps	PB	Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	B
Restriction Orifices	LBS SIA	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	C, 7
				Cracking	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-c	3.2.1.B-16	D, 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 3.2.2.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	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	C, 7
				Cracking	One-Time Inspection Program Water Chemistry Control Program			H
			Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	C, 7
				Cracking	One-Time Inspection Program Water Chemistry Control Program			H
Rupture Discs	LBS	Wrought Austenitic Stainless Steel	Treated Water,, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21 (c)	V.D2.1-b	3.2.1.B-01	C
				Cracking	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-c	3.2.1.B-16	D

See Table 2.0-1 for 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
Rupture Discs (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Terry Turbine	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	D, 20
Valves	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	B
			Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 (cont'd)	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
		Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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 (cont'd)	Cast Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	C, 6
				Cracking	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	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	C, 6
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F (cont'd)	Cracking	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 (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	C, 6
				Cracking	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	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Bolting	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air					
				Loss of Material	Bolting Integrity Program	V.E.1-b	3.2.1.B-10	A,22
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cracking	Bolting Integrity Program	V.E.2-b	3.2.1.B-18	A
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			G
				Loss of Material	Bolting Integrity Program	V.E.2-a	3.2.1.B-18	A
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	Cracking	Bolting Integrity 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.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)	LBS PB SIA (cont'd)	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels (cont'd)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cracking	Bolting Integrity Program			G
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			G
				Loss of Material	Bolting Integrity Program			G
Condensing Chambers	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
External Surfaces	PB LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.B-10	A, 4
	PB SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
	PB	Cast 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 3.2.2.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 SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	D, 1
Filters/Strainers (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	D, 2
Heat Exchangers	HT PB	Wrought Austenitic Stainless Steel	Raw Water, Low Flow	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
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	D, 3
Level Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	D, 23
Piping and Fittings	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	B
			Treated Water, temperature ≥ 140 F, but < 212 F.	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02 3.2.1.B-04	B
	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-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.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)	LBS SIA (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F.	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	V.D2.1-f	3.2.1.B-14	A
			Treated Water, temperature ≥ 140°F, but < 212°F.	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02 3.2.1.B-04	B
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F.	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	V.D2.1-f	3.2.1.B-14	A
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	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 3.2.1.B-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.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 (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	Treated Water or Steam, temperature ≥ 482°F, Low Flow (cont'd)	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 3.2.1.B-04	B
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	A
				Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	V.D2.1-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 3.2.2.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	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	B
		Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Restriction Orifices	LBS SIA	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	D, 7
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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
Restriction Orifices (cont'd)	PB (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	C, 7
				Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	V.D2.3-c	3.2.1.B-16	B
Temperature Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	D, 24
Valves	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.B-02 3.2.1.B-04	B
	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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-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	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 3.2.1.B-04	B
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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 (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	V.D2.1-b	3.2.1.B-01	C, 6
				Cracking	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
Actuator	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Dried Air or Gas	None	None			None
Blower	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	V.E.1-b	3.2.1.B-10	A, 22
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
External Surfaces	PB SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.B-10	A,4
		Wrought Austenitic Stainless Steel	Air	None	None			None
	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 3.2.2.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
External Surfaces (cont'd)	PB (cont'd)	Aluminum, and Aluminum Alloyed with Manganese, Magnesium, and Magnesium plus Silicon	Air	None	None			None
Filters/Strainers	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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			H
Piping and Fittings	PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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

See Table 2.0-1 for 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
Piping and Fittings (cont'd)	PB SIA (cont'd)	Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program			H
Restriction Orifices	PB	Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program			J
Tanks	PB	Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program			J
Valves	PB	Aluminum, 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			H
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 (cont'd)	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			H
	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
		Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	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.

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.

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 Condensers, which feature all welded construction. These are non-Class 1 components that undergo an Inservice Inspection Testing Program pressure test and utilize a Preventive Maintenance Program procedure for temperature monitoring. Continuous radiation monitoring of the condenser vent via an installed radiation monitor is also credited. 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 Floor and Equipment Drains 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 Turbine Building Closed Loop Cooling Water System (Section 2.3.3.A.25)

- NMP1 Turbine Building HVAC System (Section 2.3.3.A.26)

- NMP1 Electric Steam Boiler System (Section 2.3.3.A.27)

- NMP1 Makeup Demineralizer System (Section 2.3.3.A.28)

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 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)
- NMP2 Aux Boiler System (Section 2.3.3.B.33)
- NMP2 Circulating Water System (Section 2.3.3.B.34)
- NMP2 Makeup Water Treatment System (Section 2.3.3.B.35)
- NMP2 Radioactive Liquid Water Treatment System (Section 2.3.3.B.36)
- NMP2 Roof Drainage System (Section 2.3.3.B.37)
- NMP2 Sanitary Drains and Disposal System (Section 2.3.3.B.38)
- NMP2 Service Water Chemical Treatment System (Section 2.3.3.B.39)
- NMP2 Turbine Building Closed Loop Cooling Water System (Section 2.3.3.B.40)

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 EvaluationTable 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 EvaluationTable 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

- Table 3.3.2.A-24 Auxiliary System – NMP1 Electric Steam Boiler System – Summary of Aging Management Evaluation

- Table 3.3.2.A-25 Auxiliary System – NMP1 Makeup Demineralizer 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 EvaluationTable 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 EvaluationTable 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
- Table 3.3.2.B-32 Auxiliary System – NMP2 Radiation Monitoring System – Summary of Aging Management Evaluation
- Table 3.3.2.B-33 Auxiliary System – NMP2 Aux Boiler – Summary of Aging Management Evaluation
- Table 3.3.2.B-34 Auxiliary Systems - NMP2 Circulating Water System – Summary of Aging Management Evaluation
- Table 3.3.2.B-35 Auxiliary Systems - NMP2 Makeup Water Treatment System – Summary of Aging Management Evaluation
- Table 3.3.2.B-36 Auxiliary Systems – NMP2 Radioactive Liquid Waste Management System – NMP2 Aux Boiler – Summary of Aging Management Evaluation

- Table 3.3.2.B-37 Auxiliary Systems - NMP2 Roof Drainage System – Summary of Aging Management Evaluation
- Table 3.3.2.B-38 Auxiliary Systems - NMP2 Sanitary Drains and Disposal System – Summary of Aging Management Evaluation
- Table 3.3.2.B-39 Auxiliary Systems - NMP2 Service Water Chemical Treatment System – Summary of Aging Management Evaluation
- Table 3.3.2.B-40 Auxiliary Systems - NMP2 Turbine Building Closed Loop Cooling Water 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 SystemSection 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 SystemSection 3.3.2.A.22, NMP1 Turbine Building Closed Loop Cooling Water System
- Section 3.3.2.A.23, NMP1 Turbine Building HVAC System
- Section 3.3.2.A.24, NMP1 Electric Steam Boiler System
- Section 3.3.2.A.25, NMP1 Makeup Demineralizer 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
- Section 3.3.2.B.32, NMP2 Radiation Monitoring System
- Section 3.3.2.B.33 NMP2 Aux Boiler System
- Section 3.3.2.B.34 NMP2 Circulating Water System
- Section 3.3.2.B.35 NMP2 Makeup Water Treatment System
- Section 3.3.2.B.36 NMP2 Radioactive Liquid Waste Management System
- Section 3.3.2.B.37 NMP2 Roof Drainage System
- Section 3.3.2.B.38 NMP2 Sanitary Drains and Disposal System
- Section 3.3.2.B.39 NMP2 Service Water Chemical Treatment System
- Section 3.3.2.B.40 NMP2 Turbine Building Closed Loop Cooling Water 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)
- Fiberglass
- Gray Cast Iron

- Wrought Austenitic Stainless Steel

Environments

The NMP1 Circulating Water System components are exposed to the following environments:

- Air
- Hydraulic Fluid
- 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 Programs

The following aging management programs manage the aging effects for the NMP1 Circulating Water System components:

- Bolting Integrity Program
- Preventive Maintenance Program
- Selective Leaching Program
- Systems Walkdown Program

3.3.2.A.2 NMP1 CITY WATER SYSTEM

Material

The material of construction for the NMP1 City Water System components is:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)

- Copper Alloys (Zinc ≤ 15%)
- Glass
- Gray Cast Iron

Environment

The NMP1 City Water System components are exposed to the following environment:

- Air
- Demineralized Untreated Water

Aging Effect Requiring Management

The following aging effect, associated with the NMP1 City Water System, requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 City Water System components:

- Bolting Integrity Program
- One-Time Inspection Program
- Selective Leaching of Materials Program
- 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

- Aluminum , and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Copper Alloys (Zinc ≤ 15%)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Glass
- Gray Cast Iron
- Polymers
- 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
- 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 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:

- Bolting Integrity Program
- 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:

- Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Cast Austenitic Stainless Steel
- Copper Alloys (Zinc ≤ 15%)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- 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
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F

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
- Bolting Integrity 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)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Copper Alloys (Zinc ≤ 15%)
- Gray Cast Iron
- Polymer
- 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
- Loss of Sealing

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Control Room HVAC System components:

- Bolting Integrity Program
- Closed-Cycle Cooling Water System Program
- One-Time Inspection Program
- Preventive Maintenance 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)

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 Programs

The following aging management programs manage the aging effect for the NMP1 Diesel Generator Building Ventilation System components:

- Preventive Maintenance Program
- Systems Walkdown 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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- 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:

- 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:

- Bolting Integrity Program
- 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
- Water Chemistry and Control 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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)

- 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 Effect Requiring Management

The following aging effect, associated with the NMP1 Fire Detection and Protection System, requires 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:

- Bolting Integrity Program
- Fire Protection Program
- 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

Materials

The materials of construction for the NMP1 Hydrogen Water Chemistry System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Hydrogen Water Chemistry System components are exposed to the following environments:

- Air
- 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:

- Bolting Integrity Program
- One-Time Inspection 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)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Liquid Poison System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated water Systems with Operating Temperatures ≥ 212°F, Leaking Fluid
- 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
- Cumulative Fatigue Damage
- 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
- Bolting Integrity Program
- One-Time Inspection Program
- Systems Walkdown 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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)

Environments

The NMP1 Miscellaneous Non Contaminated Vents and Drains System components are exposed to the following environments:

- Air

- Demineralized Untreated Water
- Raw Water

Aging Effect Requiring Management

The following aging effect, associated with the NMP1 Miscellaneous Non Contaminated Vents and Drains System, requires management:

- 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:

- <u>One-Time Inspection Program</u>
- <u>Systems Walkdown Program</u>

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)
- 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)

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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Copper Alloys (Zinc ≤ 15%)
- Gray Cast Iron
- Nickel Based Alloys
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Radioactive Waste System components are exposed to the following environments:

- Air
- Air, Moisture or Wetting, temperature ≥ 140°F
- Demineralized Untreated Water
- Demineralized Untreated Water, Low Flow
- 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 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:

- Bolting Integrity Program
- Flow Accelerated Corrosions Program
- One-Time Inspection Program
- Selective Leaching of Materials Program
- Systems Walkdown Program
- Water Chemistry Control 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:

- Aluminum
- 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 Reactor Building Closed Loop Cooling Water System 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
- 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
- Cumulative Fatigue Damage
- 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:

- Bolting Integrity Program
- BWR Reactor Water Cleanup System Program
- Closed-Cycle Cooling Water System 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)
- 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:

- Bolting Integrity Program
- 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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- 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 Reactor Water Cleanup System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Water Systems with Operating Temperatures ≥ 212°F, Leaking Fluid
- Demineralized Untreated Water
- Demineralized Untreated Water, Low Flow
- Lubricating Oil
- 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 ≥ 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
- Cumulative Fatigue Damage
- Loss of Fracture Toughness
- 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
- Bolting Integrity Program
- BWR Reactor Water Cleanup System Program
- Closed-Cycle Cooling Water System Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Selective Leaching of Materials 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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Elastomer
- Nickel Based Alloys
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Sampling System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Systems with operating temperatures > 212°F, Leaking Fluid
- Demineralized Untreated Water
- Raw 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
- Cumulative Fatigue Damage
- Hardening and Shrinkage
- 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
- Bolting Integrity Program
- One-Time Inspection Program

- Preventive Maintenance 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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Copper Alloys (Zinc ≤ 15%)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Gray Cast Iron
- Polymer
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Service Water System components are exposed to the following environments:

- Air
- Raw Water
- Service Water Chemical Treatment Water

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Service Water System, require management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Service Water System components:

- Bolting Integrity Program
- 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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Cast Austenitic Stainless Steel
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Shutdown Cooling System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Water Systems with operating temperatures > 212°F
- 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
- Cumulative Fatigue Damage
- 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
- Bolting Integrity Program
- Closed-Cycle Cooling Water System 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

- Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Cast Austenitic Stainless Steel
- Copper Alloys (Zinc ≤ 15%)
- Glass
- Gray Cast Iron
- 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, Oxygenated
- Treated Water, temperature <140°F, Low Flow, Oxygenated

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:

- Bolting Integrity Program
- Closed-Cycle Cooling Water System Program
- One-Time Inspection 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 materials of construction for the NMP1 Turbine Building Closed Loop Cooling Water System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Copper Alloys (Zinc ≤ 15%)

Environments

The NMP1 Turbine Building Closed Loop Cooling Water System components are exposed to the following environments:

- Air
- Treated Water, temperature < 140°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Turbine Building Closed Loop Cooling Water System, require management:

- 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:

- Bolting Integrity Program
- 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:

- Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Fiberglass
- Gray Cast Iron

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
- 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:

- Bolting Integrity Program
- One-Time Inspection Program
- Preventive Maintenance Program
- Systems Walkdown Program

3.3.2.A.24 NMP1 ELECTRIC STEAM BOILER SYSTEM

Materials

The materials of construction for the NMP1 Electric Steam Boiler System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Copper Alloys (Zinc ≤ 15%)
- Glass

Environments

The NMP1 Electric Steam Boiler System components are exposed to the following environments:

- Air
- Closure Bolting in Non-Borated Water Systems with operating temperatures > 212°F, Leaking Fluid
- 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 NMP1 Electric Steam Boiler System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Electric Steam Boiler System components:

- Bolting Integrity Program
- Flow Accelerated Corrosion Program
- Systems Walkdown Program

3.3.2.A.25 MAKEUP DEMINERALIZER SYSTEM

Materials

The materials of construction for the NMP1 Makeup Demineralizer System components are:

- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Glass
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Makeup Demineralizer System components are exposed to the following environments:

- Air
- Demineralized, Untreated Water

Aging Effect Requiring Management

The following aging effect, associated with the NMP1 Makeup Demineralizer System, requires management:

- Loss of Material

Aging Management Program

The following aging management program manages the aging effect for the NMP1 Makeup Demineralizer System components:

- Bolting Integrity Program

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)
- 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
- Air, Moisture Wetting, temperature < 140°F
- 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:

- Bolting Integrity Program
- 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)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Alternate Decay Heat Removal System components are exposed to the following environments:

- Air
- Raw Water
- Treated Water, temperature < 140°F

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:

- Bolting Integrity Program
- One Time Inspection Program
- Open-Cycle Cooling Water System Program
- Systems Walkdown Program
- Water Chemistry Control 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)

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

The NP2 Chilled Water Ventilation System has been removed from the scope of license renewal.

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)
- 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
- Bolting Integrity Program
- One-Time Inspection 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

Environment

The NMP2 Containment Atmosphere 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 Atmosphere Monitoring System that require management, no aging management programs are required for license renewal for the NMP2 Containment Atmosphere Monitoring System.

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:

- 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 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:

- 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
- One Time Inspection Program
- Open-Cycle Cooling Water System Program
- Systems Walkdown Program
- Water Chemistry Control 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)
- 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:

- 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:

- Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Copper Alloys (Zinc ≤ 15%)

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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Copper Alloys with Zinc ≤ 15%

- 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:

- Loss of Material

Aging Management Program

The following aging management program manages the aging effects for the NMP2 Domestic Water System components:

- One-Time inspection Program
- 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)
- 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:

- Brass
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- 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
- Liquid Foam Concentrate
- Liquid Foam Concentrate/Raw Water, Low Flow
- 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:

- Bolting Integrity Program
- Buried Piping and Tanks Inspection Program

- Fire Protection Program
- Fire Water System Program
- One Time Inspection 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:

- Aluminum
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Grey Cast Iron
- 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
- 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
- Bolting Integrity 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)
- Glass
- 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

The NMP2 Glycol Heating System has been removed from the scope of license renewal.

3.3.2.B.17 NMP2 HOT WATER HEATING SYSTEM

Material

The material of construction for the NMP2 Hot Water Heating System components is:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)

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:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Hot Water Heating System components:

- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.3.2.B.18 NMP2 MAKEUP WATER SYSTEM

Material

The materials of construction for the NMP2 Makeup Water System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Makeup Water System components are exposed to the following environments:

- Air

- Treated Water, temperature <140°F

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Makeup Water System, require management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Makeup Water System components:

- One Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Control 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

Environment

The NMP2 Neutron Monitoring System components are exposed to the following environment:

- 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)
- Cast Austenitic Stainless Steel
- Wrought Austenitic Stainless Steel

Environment

The NMP2 Primary Containment Purge System components are exposed to the following environment:

- Air

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:

- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Glass
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Process Sampling System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Water Systems with operating temperatures > 212°F, Leaking Fluid
- Treated Water, temperature <140°F, Low Flow
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F
- Treated Water or Steam, temperature ≥ 482°F,Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Process Sampling System, require management:

- Cracking
- Cumulative Fatigue Damage
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Process Sampling System components:

- Bolting Integrity Program
- One-Time Inspection 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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- 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:

- 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)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Copper Alloys (Zinc ≤ 15%)
- Fiberglass
- Nickel Based Alloys
- 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
- 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:

- Bolting Integrity Program
- 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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- 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
- Closure Bolting for Non-Borated Water Systems with Operating Temperatures ≥ 212°F, Leaking Fluid
- 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
- Cumulative Fatigue Damage
- 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
- Bolting Integrity 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

The NMP2 Seal Water System has been removed from the scope of license renewal.

3.3.2.B.26 NMP2 SERVICE WATER SYSTEM

Materials

The materials of construction for the NMP2 Service Water System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- 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:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Service Water System components:

- Bolting Integrity 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:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- 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, Oxygenated

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Spent Fuel Pool Cooling and Cleanup 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 Spent Fuel Pool Cooling and Cleanup System components:

- Bolting Integrity Program
- 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)
- 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

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Standby Diesel Generator Fuel Oil System, requires management:

- 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:

- Bolting Integrity Program
- 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)
- Copper Alloys (Zinc ≤ 15%)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Glass or Polymer
- 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:

- 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:

- Bolting Integrity Program
- Closed-Cycle Cooling Water System 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.B.30 NMP2 STANDBY LIQUID CONTROL SYSTEM

Materials

The materials of construction for the NMP2 Standby Liquid Control System components are:

- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Standby Liquid Control 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, Leaking Fluid
- 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
- Cumulative Fatigue Damage

- 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
- Bolting Integrity 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)
- 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

3.3.2.B.32 NMP2 RADIATION MONITORING SYSTEM

Material

The material of construction for the NMP2 Radiation Monitoring System components is:

- Wrought Austenitic Stainless Steel

Environments

The NMP2 Radiation Monitoring System components are exposed to the following environments:

- Air
- Raw Water

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Radiation Monitoring System, requires management:

- Loss of Material

Aging Management Program

The following aging management program manages the aging effects for the NMP2 Radiation Monitoring System:

- Preventive Maintenance Program

3.3.2.B.33 NMP2 AUX BOILER SYSTEM

Materials

The materials of construction for the NMP2 Aux Boiler System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi
- Cast Austenitic Stainless Steel
- Gray Cast Iron
- Martensitic, Precipitation Hardened, and Super Ferritic Stainless Steels
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Aux Boiler System components are exposed to the following environments:

- Air
- Treated Water, temperature <140°F
- Treated Water or Steam, temperature ≥ 140°F, but < 212°F
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F
- Disodium Phosphate Solution
- Sodium Sulfite Solution

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Aux Boiler System require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Aux Boiler System components:

- Bolting Integrity Program
- Flow Accelerated Corrosion Program
- One-Time Inspection Program
- Selective Leaching of Materials Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.3.2.B.34 NMP2 CIRCULATING WATER SYSTEM

Materials

The materials of construction for the NMP2 Circulating Water System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi

Environments

The NMP2 Circulating Water System components are exposed to the following environments:

- Air

- Raw Water

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Circulating Water System requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Circulating Water System components:

- Bolting Integrity Program
- Open Cycle Cooling Water Program
- Systems Walkdown Program

3.3.2.B.35 NMP2 MAKEUP WATER TREATMENT SYSTEM

Materials

The materials of construction for the NMP2 Makeup Water Treatment System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi

Environments

The NMP2 Makeup Water Treatment System components are exposed to the following environments:

- Air
- Treated Water, temperature <140°F

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Makeup Water Treatment System requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Makeup Water Treatment System components:

- Bolting Integrity Program
- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.3.2.B.36 NMP2 RADIOACTIVE LIQUID WASTE MANAGEMENT SYSTEM

Materials

The materials of construction for the NMP2 Radioactive Liquid Waste Management System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi
- Martensitic, Precipitation Hardened, and Super Ferritic Stainless Steels
- Cast Austenitic Stainless Steel
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Radioactive Liquid Waste Management System components are exposed to the following environments:

- Air

- Treated Water, temperature <140°F

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Radioactive Liquid Waste Management System requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Radioactive Liquid Waste Management System components:

- Bolting Integrity Program
- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.3.2.B.37 NMP2 ROOF DRAINAGE SYSTEM

Material

The material of construction for the NMP2 Roof Drainage System components is:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)

Environments

The NMP2 Sanitary Drains and Disposal System components are exposed to the following environments:

- Air
- Raw Water

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Sanitary Drains and Disposal System requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Sanitary Drains and Disposal System components:

- Systems Walkdown Program
- One-Time Inspection Program

3.3.2.B.38 NMP2 SANITARY DRAINS AND DISPOSAL SYSTEM

Materials

The materials of construction for the NMP2 Sanitary Drains and Disposal System components are:

- Copper Alloys with Zinc content ≤ 15%
- Gray Cast Iron
- Martensitic, Precipitation Hardened, and Super Ferritic Stainless Steels
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Sanitary Drains and Disposal System components are exposed to the following environments:

- Air
- Demineralized Untreated Water

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Sanitary Drains and Disposal System requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Sanitary Drains and Disposal System components:

- Systems Walkdown Program
- One-Time Inspection Program
- Selective Leaching of Materials Program

3.3.2.B.39 NMP2 SERVICE WATER CHEMICAL TREATMENT SYSTEM

Materials

The materials of construction for the NMP2 Service Water Chemical Treatment System components are:

- Martensitic, Precipitation Hardened, and Super Ferritic Stainless Steels
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Service Water Chemical Treatment System components are exposed to the following environments:

- Air
- Service Water Chemical Treatment Water

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Service Water Chemical Treatment System requires management:

- Loss of Material

Aging Management Program

The following aging management program manages the aging effects for the NMP2 Service Water Chemical Treatment System components:

- One-Time Inspection Program

3.3.2.B.40 NMP2 TURBINE BUILDING CLOSED LOOP COOLING WATER SYSTEM

Materials

The materials of construction for the NMP2 Turbine Building Closed Loop Cooling Water System components are:

- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)

Environments

The NMP2 Turbine Building Closed Loop Cooling Water System components are exposed to the following environments:

- Air
- Demineralized Untreated Water

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Turbine Building Closed Loop Cooling Water System requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Turbine Building Closed Loop Cooling Water System components:

- Bolting Integrity Program
- Closed Cycle Cooling Water System 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	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2).
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, 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).
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: • Airborne Activity Monitor • 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).

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-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.
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). This item is also utilized for NMP1 RWCU pumps. 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.

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	Consistent with NUREG-1801 with exceptions (see Appendix B2,1,2). Spent fuel storage racks are addressed in Section 3.5.2.A.4 of the application.
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	NMP1 utilizes the Bolting Integrity Program to monitor potential leakage of sodium pentaborate solution onto Liquid Poison System component bolting and the Systems Walkdown Program to monitor potential leakage onto the external surfaces of carbon steel system 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 Circulating Water System circulating water gates, traveling screens and rakes, pumps, and piping and fittings, NMP1 credits the Preventive Maintenance Program for aging management. For the Core Spray System heat exchangers (Table 3.2.2.A-2), NMP1 also credits the Preventive Maintenance Program (Appendix B2.1.32) for managing the aging effect/mechanism of buildup of deposit due to biofouling and for open cycle cooling water sample lines in the Sampling System. 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 with exceptions (see Appendix B2.1.14). Additionally, the following components are consistent with, but not addressed in NUREG-1801: • Heat Exchangers • Orifices Additionally, the Bolting Integrity Program (Appendix B2.1.36) 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.

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, Screen and Pump House Building, Turbine 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	Consistent with NUREG-1801.
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	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2).
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.
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, Emergency Diesel Generator System 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	Consistent with NUREG-1801
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 row 3.1.1.B-01 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 only within scope of license renewal for spatial leakage boundary considerations relative to 10 CFR 54.4(a)(2); therefore, only the carbon steel shell is subject to AMR.

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: • Moisture Air Separators • Diesel engine air start motors and starting air lubricators • Flow Elements • Hose reel nozzles • 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), B2.1.33 (Systems Walkdown Program), and B2.1.36, Bolting Inegrity 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).
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.

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-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 addressed in LRA Section 3.5.2.B.7..
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	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2). Spenf fuel storage racks are addressed in Section 3.5.2.B.7 of the application.
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. NMP2 does not have a Liquid Poison System like NMP1.

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. • TBCLC heat exchangers in a demineralized untreated 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	The aging management of cranes is covered in the applicable subsections of Section 3.5 of the application.

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. For the NMP2 Radiation Monitoring System monitor associated with the Service Water System, the Preventive Maintenance Program is also credited for the aging management of the associated components in lieu of the Open-Cycle Cooling Water System 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-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.
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 Bolting Integrity Program (Appendix B2.1.36) for managing the aging effect of loss of material for NMP2 Compressed Air System carbon steel bolting in an air environment. • NMP2 credits the One-Time Inspection Program (Appendix B2.1.20) and 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, Auxiliary Building, Control Room Building, Diesel Generator Building, Essential Yard Structures, Radwaste Building, Screenwell Building, Standby Gas Treatment Building and Turbine 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 • Tanks • 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	Consistent with NUREG-1801..
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	Consistent with NUREG-1801..
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

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-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.
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
Actuator	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Hydraulic Fluid	None	None			None
Bolting	LBS	Carbon or Low Alloy Steel (Yield Strength > 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	A
Circulating Water Gates	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water	Loss of Material	Preventive Maintenance Program	VII.C1.6-a	3.3.1.A-17	E, 8
External Surfaces	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program Preventive Maintenance Program	VII.I.1-b	3.3.1.A-05	A
		Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	F
		Wrought Austenitic Stainless Steel	Air	None	None			None
Filter	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Hydraulic Fluid	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-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
Piping and Fittings	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Hydraulic Fluid	None	None			None
			Raw Water	Loss of Material	Preventive Maintenance Program	VII.C1.1-a	3.3.1.A-17	E
Pumps	LBS	Gray Cast Iron	Hydraulic Fluid	None	None			None
			Raw Water	Loss of Material	Preventive Maintenance Program	VII.C1.5-a	3.3.1.A-17	E
					Selective Leaching of Materials Program	VII.C1.5-a	3.3.1.A-29	E
Valves	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Hydraulic Fluid	None	None			None
		Gray Cast Iron	Raw Water	Loss of Material	Preventive Maintenance Program	VII.C1.2-a	3.3.1.A-17	E, F
					Selective Leaching Program	VII.C1.2-a	3.3.1.A-29	E, F
Tank	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Hydraulic Fluid	None	None			None
Traveling Screens and Rakes	FLT	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water	Loss of Material	Preventive Maintenance Program	VII.C1.6-a	3.3.1.A-17	E, 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-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
Traveling Screens and Rakes (cont'd)	FLT (cont'd)	Fiberglass (cont'd)	Raw Water	Cracking	Preventive Maintenance Program			F
				Loss of Strength	Preventive Maintenance Program			F
		Wrought Austenitic Stainless Steel	Raw Water	Loss of Material	Preventive Maintenance Program	VII.C1.6-a	3.3.1.A-17	E, 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
Bolting	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	A
External Surfaces	LBS	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	A
		Copper Alloys (Zinc < 15%)	Air	None	None			None
		Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program			J
		Glass	Air	None	None			None
Flow Orifice	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			J
Level Gauge	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			J
		Glass	Demineralized Untreated Water	None	None			None
Piping and Fittings	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	One-Time Inspection 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-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
Pumps	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
Tanks	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
Valves	LBS	Copper Alloys (Zinc < 15%)	Demineralized Untreated Water	None	None			None
		Gray Cast Iron	Demineralized Untreated Water	Loss of Material	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-3 Auxiliary Systems
NMP1 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
Air Dryers • Couplings • Flanges • Heads • Nozzles • Piping	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.6-a	3.3.1.A-19	B
Air Receivers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.3-a	3.3.1.A-19	B
Bolting	PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.D.1-a	3.3.1.A-19	E, 14
		Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.D.1-a	3.3.1.A-19	E
Drain Traps	PB	Copper Alloys (Zinc ≤ 15%)	Demineralized Untreated Water, Low Flow	Loss of Material	Compressed Air Monitoring Program			J
		Gray Cast Iron	Air	Loss of Material	Compressed Air Monitoring Program			J
			Demineralized Untreated Water, Low Flow	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 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
External Surfaces	PB	Aluminum alloys containing copper or zinc as the primary alloying elements	Air	None	None			None
	PB SIA	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	A
	PB SIA	Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
	PB SIA	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None
	PB	Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program			J
		Polymers	Air	Cracking	Systems Walkdown Program			J
				Hardening and Shrinkage	Systems Walkdown Program			J
				Loss of Strength	Systems Walkdown Program			J
		Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
		Red Brass Cold Worked	Air	Cracking	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 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
External Surfaces (cont'd)	PB SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
	SIA	Glass	Air	None	None			None
Flow Gauge	SIA	Glass	Demineralized Untreated Water	None	None			None
Filters/Strainers	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
	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			J
	SIA	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.A-3 Auxiliary Systems
NMP1 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
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
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.1-a	3.3.1.A-19	D, 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

See Table 2.0-1 for 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 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
Heat Exchangers (cont'd)	PB	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
	SIA NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.1-a	3.3.1.A-19	D, 6
Orifices	PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.1-a	3.3.1.A-19	D, 7
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.1-a	3.3.1.A-19	B
			Demineralized Untreated Water, Low Flow	Loss of Material	Compressed Air Monitoring 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-3 Auxiliary Systems
NMP1 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
Piping and Fittings (cont'd)	PB(cont'd)	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
		Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
		Red Brass - Cold Worked	Air	Cracking	Compressed Air Monitoring Program			H
		Wrought Austenitic Stainless Steel	Air	None	None			None
		Various Metallic Materials	Dried Air or Gas	None	None			None
	PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.1-a	3.3.1.A-19	B
	SIA	Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.1-a	3.3.1.A-19	B
			Air, Moisture or Wetting, temperature < 140°F	Loss of Material	Compressed Air Monitoring Program	VII.D.1-a	3.3.1.A-19	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-3 Auxiliary Systems
NMP1 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
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)	Dried Air or Gas	None	None			None
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Dried Air or Gas	None	None			None
		Aluminum, 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)	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.5-a	3.3.1.A-19	B
		Gray Cast Iron	Air	Loss of Material	Compressed Air Monitoring Program			F
	SIA NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.5-a	3.3.1.A-19	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-3 Auxiliary Systems
NMP1 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
Tanks	SIA NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.3-a	3.3.1.A-19	B
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.2-a	3.3.1.A-19	B
			Dried Air or Gas	None	None			None
		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			H
		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			H
		Gray Cast Iron	Air	Loss of Material	Compressed Air Monitoring Program			F
		Polymers	Air	Cracking	Compressed Air Monitoring Program			H
				Hardening and Shrinkage	Compressed Air Monitoring Program			H
				Loss of Strength	Compressed Air 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 3.3.2.A-3 Auxiliary Systems
NMP1 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 (cont'd)	Aluminum, 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
	PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.2-a	3.3.1.A-19	B
	SIA	Copper Alloys (Zinc ≤ 15%)	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-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
Airborne Activity Monitor	SIA NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F3.4-a	3.3.1.A-05	C
Blower	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F3.4-a	3.3.1.A-05	C
Bolting	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	A, 5
	LBS SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
Ducting	PB	Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
External Surfaces	PB	Cast Austenitic Stainless Steel	Air	None	None			None
	SIA	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	A
	PB SIA	Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
	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-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
External Surfaces	PB	Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
	PB SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
Filters/Strainers	FLT PB PH	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection 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
Flame Arresters	PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Flow Elements	PB PH	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
Flow Elements (cont'd)	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F3.4-a	3.3.1.A-05	C
			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	Preventive Maintenance Program			H, 9
			Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			H
		Copper Alloys (Zinc ≤ 15%)	Air, Moisture or Wetting, temperature ≥ 140°F	None	None			None
			Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			H
		Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature ≥ 140°F	Cracking	Preventive Maintenance Program			H
				Loss of Material	Preventive Maintenance Program	VII.F3.4-a	3.3.1.A-05	C, 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-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
Piping and Fittings	LBS PB PH SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	10 CFR 50 Appendix J Program	VII.F3.4-a	3.3.1.A.-05	C, 10
					Preventive Maintenance Program	VII.F3.4-a	3.3.1.A.-05	C, 10
			Air, Moisture or Wetting, temperature ≥ 140°F	Loss of Material	Preventive Maintenance Program	VII.F3.4-a	3.3.1.A-05	C, 10
			Dried Air or Gas	None	None			None
			Demineralized Untreated Water, Low Flow	Loss of Material	Preventive Maintenance Program			J
		Copper Alloys (Zinc ≤ 15%)	Dried Air or Gas	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
			Dried Air or Gas	None	None			None
Pumps	PB SIA	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Rupture Discs	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
Rupture Discs (cont'd)	SIA	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Tanks	PB SIA	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 PH	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	10 CFR 50 Appendix J Program	V.C.1-a	3.3.1.A-05	E
					One-Time Inspection Program	VII.F3.4-a	3.3.1.A-05	C, 2
			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
		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

See Table 2.0-1 for 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 PH (cont'd)	Aluminum, 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
		Wrought Austenitic Stainless Steel (cont'd)	Demineralized Untreated Water, Low Flow	Loss of Material	Preventive Maintenance Program			J
	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F3.4-a	3.3.1.A-05	C, 2
			Dried Air or Gas	None	None			None
		Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Vaporizers	HT PB	Copper Alloys (Zinc ≤ 15%)	Air	Loss of Heat Transfer	One-Time Inspection Program			J
	PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
	LBS SIA NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	Preventive Maintenance Program	VII.F3.3-a	3.3.1.A-15	E
	SIA	Copper Alloys (Zinc ≤ 15%)	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	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	Bolting Integrity Program	VII.F1.1-a	3.3.1.A-05	A
Ducting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.A-05	A
Expansion Tank	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program			H
External Surfaces	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	A
		Cast Austenitic Stainless Steel	Air	None	None			None
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
		Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	F
		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.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
Filters/Strainers	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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)	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)	Air	Loss of Material	Preventive Maintenance Program	VII.F1.4-a	3.3.1.A-05	C, 6
			Dried Air or Gas	None	None			None
		Copper Alloys (Zinc ≤ 15%)	Air	Loss of Heat Transfer	Preventive Maintenance Program			H, 9
			Demineralized Untreated Water	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program			K
			Dried Air or Gas	None	None			None
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program			H, 9
			Dried Air or Gas	None	None			None
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			H
			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)	PB (cont'd)	Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
			Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			H
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.A-05	C, 10
			Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
Pumps	PB	Copper Alloys (Zinc ≤ 15%)	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			H
Seals and Gaskets	PB	Polymer	Air	Loss of Sealing	Systems Walkdown Program			J
Temperature Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.A-05	C, 17
Valves and Dampers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.A-05	A, 23
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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

See Table 2.0-1 for 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 (cont'd)	Cast Austenitic Stainless Steel	Demineralized Untreated Water	None	None			None
		Copper Alloys (Zinc ≤ 15%)	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			H
		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)	Air	Loss of Material	Preventive Maintenance Program	VII.F4.1-a	3.3.1.A-05	A
External Surfaces	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	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)	Air	Loss of Material	Preventive Maintenance Program	VII.H2.3-a	3.3.1.A-05	A
Air Start Motors	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.A-05	C
Bolting	PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	A, 5
Compressors	SIA NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2.a	3.3.1.A-05	A
Exhausts for Emergency Diesel Generator	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Exhaust	Loss of Material	Preventive Maintenance Program	VII.H2.4-a	3.3.1.A-05	A
External Surfaces	PB SIA	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	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
	PB	Cast Austenitic Stainless Steel	Air	None	None			None
	PB SIA	Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
	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-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
External Surfaces (cont'd)	PB (cont'd)	Glass	Air	None	None			None
		Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	F
		Wrought Austenitic Stainless Steel	Air	None	None			None
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
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	VII.C1.5-a	3.1.1.A-29	D
	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)	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 SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
		Wrought Austenitic Stainless Steel	Lubricating Oil	None	None			None
			Raw Water	Loss of Heat Transfer	Open-Cycle Cooling Water System Program			H
			Raw Water (cont'd)	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	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 SIA (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1..A-02	D, 6
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
		Wrought Austenitic Stainless Steel	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	C, 6
			Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D, 6
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)	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

See Table 2.0-1 for 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
Orifices	FC PB	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Lubricating Oil	None	None			None
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Fuel Oil without Water Contamination	None	None			None
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.A-05	A
			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
Pumps	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Fuel Oil without Water Contamination	None	None			None
			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

See Table 2.0-1 for 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 (cont'd)	PB (cont'd)	Gray Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program			F
Tanks	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Fuel Oil	Loss of Material	Fuel Oil Chemistry Program One-Time Inspection Program	VII.H1.4-a	3.3.1.A-07	A
			Air	Loss of Material	One-Time Inspection Program	VII.H2.2-a	3.3.1.A-05	A
Tanks (cont'd)	PB (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	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	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Fuel Oil without Water Contamination	None	None			None
			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

See Table 2.0-1 for 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 (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	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
		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	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 (cont'd)	Wrought Austenitic Stainless Steel(cont'd)	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program	VIII.E.5-b	3.4.1.A-02	D
	SIA	Copper Alloys (Zinc ≤ 15%)	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-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	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	A, 5
External Surfaces	LBS PB SIA	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	A
	LBS PB SPR	Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
	LBS PB	Copper Alloys (Zinc >15%) Aluminum Bronze, Stainless Steel	Air	None	None			None
	PB	Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program			J
	LBS PB	Wrought Austenitic Stainless Steel	Air	None	None			None
Filters/Strainers	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.A-21	A
Fire Hydrants	PB	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

See Table 2.0-1 for 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
Flow Elements	LBS PB	Wrought Austenitic Stainless Steel	Raw Water, Low Flow	Cracking	One-Time Inspection Program			H
				Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.A-21	C, 11
Gearbox	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Lubricating Oil	None	None			None
Heat Actuated Devices and associated tubing	PB	Copper Alloys (Zinc > 15%) and Aluminum Bronze, Stainless Steel	Dry Air or Gas	None	None			None
Heat Exchangers	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-a	3.3.1.A-21	C, 6
Orifices	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	One-Time Inspection Program			H
				Loss of Material	Fire Water System Program	VII.G.6-a	3.3.1.A-21	C, 7
Piping and Fittings	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Preventive Maintenance Program	VII.H2.3-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-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	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Exhaust	Loss of Material	Fire Protection 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
			Soil, above the water table	None	None			None
			Soil, below the water table	None	None			None
			Raw Water, Low Flow	None	None			None
	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-a	3.3.1.A-21	A
Pumps	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.A-21	A
Silencers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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

See Table 2.0-1 for 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
Sluice Gate for Motor Driven Fire Pump	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.A-21	C, 22
Spray Nozzles	LBS PB SPR	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	LBS PB SPR	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
Tanks and Air Receivers	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
Bolting	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	A
External Surfaces	LBS	Wrought Austenitic Stainless Steel	Air	None	None			None
Flow Element	LBS	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	One-Time Inspection Program Water Chemistry Control Program			G
Piping and fittings	LBS	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	One-Time Inspection Program Water Chemistry Control Program			G
Valves	LBS	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	One-Time Inspection Program Water Chemistry Control 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-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
Bolting	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	A, 5
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21 (c)			G
				Cracking	Bolting Integrity Program	VII.I.2-b	3.3.1.A-24	B
				Loss of Material	Bolting Integrity Program	VII.I.2-a	3.3.1.A-24	B
						VII.I.1-a	3.3.1.A-14	E
External Surfaces	PB LBS SIA	Cast Austenitic Stainless Steel	Air	None	None	None		None
		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	A
						VII.I.1-a	3.3.1.A-14	E
		Wrought Austenitic Stainless Steel	Air	None	None	None		None
Piping and Fittings	LBS SIA	Wrought Austenitic Stainless Steel	Sodium Pentaborate Solution	Cracking	Water Chemistry Control Program	VII.E2.1-a	3.3.1.A-25	B
			Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D

See Table 2.0-1 for 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 (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	Cracking	Water Chemistry Control Program	VII.E2.1-a	3.3.1.A-25	B
			Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.A-01	A
Pumps	PB	Wrought Austenitic Stainless Steel	Sodium Pentaborate Solution	Cracking	Water Chemistry Control Program	VII.E2.4-a	3.3.1.A-25	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-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 LBS SIA	Wrought Austenitic Stainless Steel	Sodium Pentaborate Solution	Cracking	Water Chemistry Control Program	VII.E2.2-a	3.3.1.A-25	B
			Treated Water, temperature <140°F	None	None			None
Valves	LBS SIA	Cast Austenitic Stainless Steel	Sodium Pentaborate Solution	Cracking	Water Chemistry Control Program	VII.E2.3-a	3.3.1.A-25	B
			Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
		Wrought Austenitic Stainless Steel	Sodium Pentaborate Solution	Cracking	Water Chemistry Control Program	VII.E2.3-a	3.3.1.A-25	B
			Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
	PB	Cast Austenitic Stainless Steel	Sodium Pentaborate Solution	Cracking	Water Chemistry Control Program	VII.E2.3-a	3.3.1.A-25	B
			Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D

See Table 2.0-1 for 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 (cont'd)	Cast Austenitic Stainless Steel (cont'd)	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10CFR 54.21(c)	IV.C.1.3-d	3.1.1.A-01	A
			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	Cracking	Water Chemistry Control Program	VII.E2.3-a	3.3.1.A-25	B
			Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E-5-b	3.4.1.A-02	D

See Table 2.0-1 for 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 (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10CFR 54.21(c)	IV.C1.3-d	3.1.1.A-01	A
	SIA	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-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
External Surfaces	LBS	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	A
Piping and Fittings	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			H, 29
			Raw Water	Loss of Material	One-Time Inspection Program	VII.C1.1-a	3.3.1.A-17	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-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
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	A
External Surfaces	PB	Aluminum alloys containing copper or zinc as the primary alloying elements	Air	None	None			None
		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	A
		Wrought Austenitic Stainless Steel	Air	None	None			None
Piping	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	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
External Surfaces	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	A, 3
Dampers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	A, 5
External Surfaces	LBS PB SIA	Cast Austenitic Stainless Steel	Air	None	None	None		None
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	System Walkdown Program	VII.I.1-b	3.3.1.A-05	A
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
		Gray Cast Iron	Air	Loss of Material	System Walkdown Program	None		
		Nickel Based Alloys	Air	None	None	None		None
		Wrought Austenitic Stainless Steel	Air	None	None	None		None
Filters/Strainers	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
Flow Element	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	One-Time Inspection 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-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
Heat Exchangers	LBS	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
			Air	None	None			None
			Air, Moisture or Wetting, temperature ≥ 140°F	Cracking	One-Time Inspection Program			G
Piping and Fittings	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
			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
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.C.1-b	3.4.1.A-02	B
				Loss of Material	Flow Accelerated Corrosion	VIII.C.1-a	3.4.1.A-06	A
		Nickel Based Alloys	Demineralized Untreated Water	Loss of Material	One-Time Inspection 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-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)	LBS (cont'd)	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
			Air	None	None			None
			Air, Moisture or Wetting, temperature ≥ 140°F	Cracking	One-Time Inspection Program			G
	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
	FP LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
			Treated Water, temperature ≥ 140°F but < 212°F	Loss of Material	One-Time Inspection Program			G
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
			Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	One-Time Inspection Program			G
	SIA	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	One-Time Inspection 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-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
Pumps	LBS	Gray Cast Iron	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program Selective Leaching of Materials Program			G
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
	FP LBS NSS SIA	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
	NSS PB SIA	Gray Cast Iron	Demineralized Untreated Water	Loss of Materials	One-Time Inspection Program			G
Separator	LBS	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
Tanks	LBS	Nickel Based Alloys	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
	NSS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			D

See Table 2.0-1 for 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
Tanks (cont'd)	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program			G
			Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	One-Time Inspection Program			G
Valves	FP LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
			Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program			G
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.C.1-b	3.4.1.A-02	D
	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	Flow Accelerated Corrosion Program	VIII.C.1-a	3.4.1.A-06	C
		Cast Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	One-Time Inspection 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-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)	LBS (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program			G
	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	One-Time Inspection Program			G
	FP LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water, Low Flow	Loss of Material	One-Time Inspection Program			
			Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	One-Time Inspection Program			
		Copper Alloys (Zinc ≤ 15%)	Demineralized Untreated Water	Loss of Material	One-Time Inspection 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-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 (cont'd)	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program			G
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program			G
	PB SIA	Copper Alloys (Zinc ≤ 15%)	Demineralized Untreated Water	Loss of Material	One-Time Inspection 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
Actuators	PB	Aluminum	Air	None	None			None
			Dried Air or Gas	None	None			None
Bolting	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	A
External Surfaces	PB	Aluminum	Air	None	None			None
		Copper Alloys (Zinc ≤15%) and Aluminum Bronze	Air	None	None			None
		Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	F
	LBS PB	Cooper Alloys (Zinc ≤ 15%)	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
	LBS PB SIA	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	A
Filters/Strainers	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			J
		Copper Alloys (Zinc ≤ 15%)	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-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 (cont'd)	FLT PB (cont'd)	Gray Cast Iron	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program Selective Leaching of Materials Program			J
	SIA	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System 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			J
Heat Exchangers	HT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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

See Table 2.0-1 for 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 (cont'd)	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
			Raw Water, Low Flow	Loss of Heat Transfer	Open Cycle Cooling Water Program			J
				Loss of Material	Open Cycle Cooling Water Program Selective Leaching of Materials Program			J
			Treated Water, temperature <140°F	Loss of Heat Transfer	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 (cont'd)	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program One-Time Inspection Program			J, 9
			Raw Water	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	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			J
				Cracking	One-Time Inspection Program Water Chemistry Control Program			J
	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			J
			Raw Water, Low Flow	Loss of Material	Open Cycle Cooling Water 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
Heat Exchangers (cont'd)	PB NSS SIA	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.4-a	3.3.1.A-17	C, 6
Orifices	FC PB	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
Piping and Fittings	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)						
			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			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
Piping and Fittings (cont'd)	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, Moisture or Wetting, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program			G
			Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
			Dried Air or Gas	None	None			None
Pumps	PB	Gray Cast Iron	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program Selective Leaching of Materials Program			G
Temperature Elements	PB	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
Valves	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
		Copper Alloys (Zinc ≤ 15%)	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-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	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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			H
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program Selective Leaching of Materials Program			H
		Gray Cast Iron	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program Selective Leaching of Materials Program	VII.C2.3-a	3.3.1.A-29	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
Valves (cont'd)	PB (cont'd)	Gray Cast Iron (cont'd)	Demineralized Untreated Water, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program Selective Leaching of Materials Program	VII.C2.3-a	3.3.1.A-29	G
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, Moisture or Wetting, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program			G
			Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
			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-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)	Air	Loss of Material	Preventive Maintenance Program	VII.I.1-b	3.2.1.A-03	A
		Polymers		Hardening and Shrinkage	Preventive Maintenance Program	VII.F1.1-b	3.3.1.A-02	A
				Loss of Strength	Preventive Maintenance Program	VII.F1.1-b	3.3.1.A-02	A
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.F2.1-a	3.3.1.A-05	A
Ducting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program	V.B.1-a	3.2.1.A-03	A
External Surfaces	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	A
		Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	F
		Polymers	Air	Cracking	Systems Walkdown Program			J
				Hardening and Shrinkage	Systems Walkdown Program			J
				Loss of Strength	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-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
External Surfaces (cont'd)	PB (cont'd)	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None
Filters	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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)	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
Valves and Dampers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	D, 5
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			G
				Cracking	Bolting Integrity Program	VII.I.2-b	3.3.1.A-24	A
				Loss of Material	Bolting Integrity Program	VII.I.2-a	3.3.1.A-24	A
External Surfaces	PB LBS SIA	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Air	Loss of Material	Systems Walkdown Material	VII.I.1-b	3.3.1.A-05	A
		Cast Austenitic Stainless Steel	Air	None	None			None
		Wrought Austenitic Stainless Stell	Air	None	None			None
Filters	LBS	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	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

See Table 2.0-1 for 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
Filters (cont'd)	LBS (cont'd)	Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
Flow Elements	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
Flow Gauges	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
Heat Exchangers	PB LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program			H
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			H
				Loss of Material	Flow-Accelerated Corrosion Program			H
		Copper Alloys (Zinc ≤ 15%)	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-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
Heat Exchangers (cont'd)	PB LBS (cont'd)	Copper Alloys (Zinc ≤ 15%) (cont'd)	Lubricating Oil	None	None			None
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water	None	None			None
			Treated Water or Steam, temperature ≥140°F, but <212°F	Cracking				
					One-Time Inspection Program Water Chemistry Control Program	VII.E3.4-a	3.3.1.A-04	B
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.A-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-c	3.1.1.A-25	C
					One-Time Inspection Program Water Chemistry Control Program			H
		Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	VII.E3.1-b	3.3.1.A-03	A
				Cracking	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
Piping and Fittings (cont'd)	LBS SIA	Carbon or Low Alloy Steel(Yield Strength <100 Ksi)	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 or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	Flow-Accelerated Corrosion Program	VIII.D2.1-a	3.4.1.A-06	A
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	VIII.D2.1-c	3.4.1.A-01	A
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.1-b	3.4.1.A-02	D
			Treated Water or Steam, temperature ≥ 482°F	Loss of Material	Flow-Accelerated Corrosion Program	VIII.D2.1-a	3.4.1.A-06	A
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	VIII.D2.1-c	3.4.1.A-01	A
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.1-b	3.4.1.A-02	D
		Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D

See Table 2.0-1 for 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
Piping and Fittings (cont'd)	LBS SIA (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	BWR Reactor Water Cleanup System Program	VII.E3.1-a	3.3.1.A-26	B
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	VII.E3.1-b	3.3.1.A-03	A
Pumps	LBS	Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
		Gray 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	D
					Selective Leaching of Materials Program			H
Tanks	LBS	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D

See Table 2.0-1 for 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)	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 ≥ 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
			Treated Water or Steam, temperature ≥ 482°F, Low Flow (cont'd)	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	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 (cont'd)	Cast Austenitic Stainless Steel (cont'd)	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
			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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 (cont'd)	Cast Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F, Low Flow (cont'd)	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 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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-d	3.1.1.A-01	A
				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-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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-d	3.1.1.A-01	A
				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-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)	LBS SIA	Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	VII.E.3.1-b	3.3.1.A-03	D
		Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	VII.E3.1-b	3.3.1.A-03	C

See Table 2.0-1 for 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
Bolting	PB LBS SIA	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	A
			Closure Bolting for Non-Borated Systems with operating temperature ≥212°F, Leaking Fluid	Loss of Material	Bolting Integrity Program	VII.I.2-a	3.3.1.A-24	A
External Surfaces	PB LBS SIA	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	A
		Nickel Based Alloys	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
Heat Exchangers	PB	Nickel Based Alloys	Demineralized Untreated Water	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-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 (cont'd)	PB (cont'd)	Nickel Based Alloys (cont'd)	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			F
				Cracking	One-Time Inspection Program Water Chemistry Control Program			F
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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	VII.E3.1-b	3.3.1.A-03	A
	LBS SIA	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Treated Water, temperature < 140°F. Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-a	3.4.1.A-02	D
			Raw Water	Loss of Material	Preventive Maintenance Program	VII.C1.1-a	3.3.1.A-17	E
		Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D

See Table 2.0-1 for 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 (cont'd)	LBS SIA (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Raw Water	Loss of Material	Preventive Maintenance Program	VII.C1.1-a	3.3.1.A-17	E
	LBS	Elastomer	Raw Water	Hardening and Shrinkage	Preventive Maintenance Program			F
Pumps	LBS	Wrought Austenitic Stainless Steel	Raw Water	Loss of Material	Preventive Maintenance Program	VII.C1.1-a	3.3.1.A-17	E
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			J
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	VII.E3.1-b	3.3.1.A-03	C, 28
Valves	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D

See Table 2.0-1 for 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 (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	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
			Treated Water or Steam, temperature ≥ 482°F, Low Flow (cont'd)	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-d	3.1.1.A-01	A
	LBS SIA	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			Raw Water	Loss of Material	Preventive Maintenance Program	VII.C1.2-a	3.3.1.A-17	E
		Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Treated Water, temperature <140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-a	3.4.1.A-02	D

See Table 2.0-1 for 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	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	A, 5
External Surfaces	PB LBS SIA	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	A
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	Loss of Material	Systems Walkdown Program			J
		Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	E
		Polymer	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
Filters/Strainers	FLT LBS NSS PB SIA	Gray Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials 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.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
Flow Elements	LBS PB	Gray Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program	VII.C1.5-a	3.3.1.A-29	C
Heat Exchangers	LBS NSS SIA	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.3-a	3.3.1.A-17	A
	LBS SIA	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
Piping and Fittings	LBS	Polymer	Service Water Chemical Treatment Water	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.1-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
Piping and Fittings (cont'd)	LBS PB SIA (cont'd)	Gray Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program	VII.C1.5-a	3.3.1.A-29	C
		Wrought Austenitic Stainless Steel	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.1-a	3.3.1.A-17	A
Pumps	LBS	Polymer	Service Water Chemical Treatment Water	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
	LBS PB	Gray Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program	VII.C1.5-a	3.3.1.A-29	A
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
Valves	LBS	Polymer	Service Water Chemical Treatment Water	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
	LBS PB SIA	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
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
	PB	Gray Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program	VII.C1.5-a	3.3.1.A-29	A
		Wrought Austenitic Stainless Steel	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-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
Bolting	PB LBS	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	A
			Closure Bolting for Non-Borated Water Systems with operating temperatures >212°F	Loss of Material	Bolting Integrity Program	VII.I.2-a	3.3.1.A-05	A
				Cracking	Bolting Integrity Program	VII.I.2-b	3.3.1.A-05	A
External Surfaces	PB LBS	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	A
		Cast Austenitic Stainless Steel	Air	None	None			None
	PB LBS SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
Flow Elements	LBS	Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.E4.1-a	3.3.1.A-08	D

See Table 2.0-1 for 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
Heat Exchangers	HT PB LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	A
		Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.E4.1-a	3.3.1.A-08	D
	PB LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.E4.1-a	3.3.1.A-08	D
Orifices	FC PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	VII.E4.1-b	3.3.1.A-03	C, 7
				Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	VII.E4.1-c	3.3.1.A-27	D

See Table 2.0-1 for 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 (cont'd)	PB LBS	Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.E4.1-a	3.3.1.A-08	D
Piping and Fittings	PB LBS SIA	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.E4.1-a	3.3.1.A-08	B
Pumps	PB LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
Valves	PB LBS	Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.E4.1-a	3.3.1.A-08	D
		Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.E4.1-a	3.3.1.A-08	D
		Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.E4.1-a	3.3.1.A-08	D

See Table 2.0-1 for 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 LBS (cont'd)	Cast Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	VII.E4.3-a	3.3.1.A-27	B
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	VII.E4.1-b	3.3.1.A-03	C
				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	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.E4.1-a	3.3.1.A-08	D

See Table 2.0-1 for 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 LBS (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	VII.E4.3-a	3.3.1.A-27	B
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	VII.D2.1-d	3.3.1.A-03	C

See Table 2.0-1 for 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
Bolting	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	A
External Surfaces	LBS PB SIA	Aluminum alloys containing copper or zinc as the primary alloying elements	Air	None	None			None
		Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
		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	A
		Cast Austenitic Stainless Steel	Air	None	None			None
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
		Glass	Air	None	None			None
		Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	F
		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.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)	Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			F
		Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.2-a	3.3.1.A-01	B
Flow Elements	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.1-a	3.3.1.A-01	D
Flow Gauge	LBS	Glass	Treated Water, temperature <140°F, Oxygenated	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, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.4-b	3.3.1.A-01	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-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)	HT PB (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program	VII.A4.4-a	3.3.1.A-15	A
			Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.4-b	3.3.1.A-01	B
		Copper Alloys (Zinc ≤ 15%)	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			H
			Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			F
Piping and Fittings	LBS PB SIA	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.1-a	3.3.1.A-01	B
Pumps	LBS NSS PB SIA	Gray Cast Iron	Treated Water, temperature <140°F, Oxygenated	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 3.3.2.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
Tanks	LBS NSS PB SIA	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.2-a	3.3.1.A-01	D
Valves	LBS PB SIA	Aluminum alloys containing copper or zinc as the primary alloying elements	Treated Water, temperature <140°F, Oxygenated	Cracking	One-Time Inspection Program Water Chemistry Control Program			H
			Treated Water, temperature <140°F, Low Flow, Oxygenated	Cracking	One-Time Inspection Program Water Chemistry Control Program			H
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			H
			Treated Water, temperature < 140°F, Low Flow, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			H
		Cast Austenitic Stainless Steel	Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.3-a	3.3.1.A-01	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-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)	LBS PB SIA (cont'd)	Copper Alloys (Zinc ≤ 15%)	Treated Water, temperature < 140°F, Low Flow, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			F
		Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			F
		Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
			Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.3-a	3.3.1.A-01	B
			Treated Water, temperature < 140°F, Low Flow, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.3-a	3.3.1.A-01	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-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
Bolting	LBS SIA	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	A
External Surfaces	LBS SIA	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	A
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
Heat Exchangers	LBS	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.1-a	3.3.1.A-15	C
Piping and Fittings	LBS SIA	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.1-a	3.3.1.A-15	A
Pumps	LBS	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.3-a	3.3.1.A-15	A
Strainers	LBS	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.1-a	3.3.1.A-15	C
Tank	LBS NSS SIA	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.4-a	3.3.1.A-15	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-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
Valves	LBS SIA	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.2-a	3.3.1.A-15	A
		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 3.3.2.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	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	C, 5
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	C, 5
Ducting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F2.1-a	3.3.1.A-05	A
		Fiberglass	Air with Vibratory Motion	Cracking	Preventive Maintenance Program			J
				Loss of Material	Preventive Maintenance Program			J
				Loss of Strength	Preventive Maintenance Program			J
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection 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-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
External Surfaces	PB	Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
		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	A
		Fiberglass	Air	None	None			None
		Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	F
Muffler	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F2.4-a	3.3.1.A-05	A
Valves and Dampers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	VII.F2.1-a	3.3.1.A-05	F
Vents	PB	Aluminum, 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.A-24 Auxiliary Systems
NMP1 Electric Steam Boiler System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Boiler	LBS	Carbon or Low Alloy Steel (Yield Strength ≤100 Ksi)	Treated Water or Steam, temperature ≥ 212°F but < 482°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.C.1-b	3.4.1.A-02	D
Bolting	LBS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Closure Bolting in Non-Borated Water Systems with operating temperatures > 212°F, Leaking Fluid	Loss of Material	Bolting Integrity Program	VII.I.2-a	3.3.1.A-24	A
				Cracking	Bolting Integrity Program	VII.I.2-b	3.3.1.A-24	A
Drain Trap	LBS	Copper Alloys (Zinc ≤ 15%)	Treated Water, temperature ≥ 140°F but <212°F	None	None			None
External Surfaces	LBS	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	A
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
		Glass	Air	None	None			None
Level Gauge	LBS	Glass	Treated Water or Steam, temperature ≥ 212°F but < 482°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-24 Auxiliary Systems
NMP1 Electric Steam Boiler System – Summary of Aging 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	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 or Steam, temperature ≥ 212°F but < 482°F	Loss of Material	Flow-Accelerated Corrosion Program	VIII.C.1-a	3.4.1.A-06	A
Strainer	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	D
Valves	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F but < 482°F	Loss of Material	Flow-Accelerated Corrosion Program	VIII.C.2-a	3.4.1.A-06	A
		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 3.3.2.A-25 Auxiliary Systems
NMP1 Makeup and Demineralizer System – Summary of Aging 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	LBS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	A
External Surfaces	LBS	Cast Austenitic Stainless Steel	Air	None	None			None
		Glass	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
Flow Gauge	LBS	Glass	Demineralized Untreated Water	None	None			None
Piping and Fittings	LBS	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	None	None			None
Pumps	LBS	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	None	None			None
Tank	LBS	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	None	None			None
Valves	LBS	Cast 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-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
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
Diesel Engine Air Start Motors	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.B-05	C, 19
Expansion Joints	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.B-05	A
		Wrought Austenitic Stainless Steel	Air	None	None			None
External Surfaces	PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Preventive Maintenance Program Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A
	PB	Cast Austenitic Stainless Steel	Air	None	None			None
		Nickel Based Alloys	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
Filters/Strainers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
Moisture Air Separators	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.B-05	C, 20
Mufflers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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)	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.B-05	A
		Wrought Austenitic Stainless Steel	Air	None	None			None
			Exhaust	Loss of Material	Preventive Maintenance Program			F
	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.B-05	A
			Air, Moisture or Wetting, temperature <140°F	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.B-05	A
Starting Air Lubricator	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.B-05	C, 19
Tanks	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-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
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
External Surfaces	PB SIA	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	A
	LBS SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
Flow Elements	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Contro Program	VIII.E.5-b	3.4.1.B-02	D
Heat Exchanger	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Contro Program	VIII.E.5-b	3.4.1.B-02	D
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C3.1-a	3.3.1.B-17	A
	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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
Piping and Fittings (cont'd)	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C3.1-a	3.3.1.B-17	A
Pump	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Contro Program	VIII.E.5-b	3.4.1.B-02	D
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C3.2-a	3.3.1.B-17	A
	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C3.2-a	3.3.1.B-17	A
		Wrought Austenitic Stainless Steel	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)	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

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
The NMP2 Chilled Water Ventilation System has been removed from the scope of license renewal.								

See Table 2.0-1 for 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 SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
External Surfaces	PB SIA	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	A
	PB	Cast Austenitic Stainless Steel	Air	None	None			None
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None
		Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
	PB SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
Filter	SIA	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-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
Piping and Fittings	PB PH	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	10 CFR 50 Appendix J Program	VII.D.1-a	3.3.1.B-19	E
					One-Time Inspection Program	VII.D.1-a	3.3.1.B-19	E
			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
	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	10 CFR 50 Appendix J Program	VII.D.1-a	3.3.1.B-19	E
					One-Time Inspection Program	VII.D.1-a	3.3.1.B-19	E
		Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
			Air	None	None			None
Orifices	FC PB	Various Metallic Materials	Dried Air or Gas	None	None			None
		Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Radiation Collars	RD	Wrought Austenitic Stainless Steel	Air	None	None			None
Tanks and Receivers	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.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
Rupture Discs	PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Valves	PB PH	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Dried Air or Gas	None	None			None
		Various Metallic Materials	Dried Air or Gas	None	None			None
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	10 CFR 50 Appendix J Program	VII.D.2-a	3.3.1.B-19	E
					One-Time Inspection Program	VII.D.2-a	3.3.1.B-19	E
			Dried Air or Gas	None	None			None
		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
		Aluminum, 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-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)	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	10 CFR 50 Appendix J Program	VII.D.2-a	3.3.1.B-19	E
					One-Time Inspection Program	VII.D.2-a	3.3.1.B-19	E
		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-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	None	None			None
External Surfaces	PB SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
Condensing Chambers	PB	Wrought Austenitic Stainless Steel	Air	None	None			None
Piping and Fittings	PB SIA	Wrought Austenitic Stainless Steel	Air	None	None			J
Pumps	PB	Wrought Austenitic Stainless Steel	Air	None	None			None
Valves	PB SIA	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-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
Bolting	PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-B	3.3.1.B-05	A
Piping and Fittings	PB SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
Valves	PB SIA	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
Bolting	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-B	3.3.1.B-05	A
Chillers	HT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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			H
				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)	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	C, 6
		Gray 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.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
External Surfaces	PB LBS SIA	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	A
	PB	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None
		Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	F
		Wrought Austenitic Stainless Steel	Air	None	None			None
Flow Elements	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.F1.3-a	3.3.1.B-15	A
			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	A
	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.F1.3-a	3.3.1.B-15	A
			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	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-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)	Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.3-a	3.3.1.B-15	A
		Gray Cast iron	Lubricating Oil	None	None			None
Tanks	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.4-a	3.3.1.B-15	A
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.2-a	3.3.1.B-15	A
			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	A
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Dried Air or Gas	None	None			None
		Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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)	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.2-a	3.3.1.B-15	A
			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	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
Air Handling Unit	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.B-05	A
Blowers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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)	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.B-05	A
External Surfaces	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	A
		Gray Cast Iron	Air	Loss Of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	F
External Surfaces (cont'd)	PB (cont'd)	Wrought Austenitic Stainless Steel	Air	None	None			None
Filters/Strainers	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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)	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-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-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
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			H, 9
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Preventive Maintenance Program	VII.F1.1-a	3.3.1.B-05	C, 10
			Raw Water, Low Flow	Loss of Material	Preventive Maintenance Program	VII.C1.1-a	3.3.1.B-17	E
		Polymers	Air	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
Valves and Dampers (includes fire dampers)	FB PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.B-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.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) (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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			H
		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)	Air	Loss of Material	Preventive Maintenance Program	VII.F4.1-a	3.3.1.B-05	A
		Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
Dampers (includes fire dampers)	FB PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Fire Protection Program	VII.F4.1-a	3.3.1.B-05	A, 4
					Preventive Maintenance Program	VII.F4.1-a	3.3.1.B-05	A
Ducting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F4.1-a	3.3.1.B-05	A
External Surfaces	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	A
		Aluminum, 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-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			F
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	LBS PB	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
External Surfaces	LBS	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	A
		Copper Alloys with Zinc Contents ≤ 15%	Air	None	None			None
	LBS PB	Wrought Austenitic Stainless Steel	Air	None	None			None
Piping and Fittings	LBS	Copper Alloys with Zinc Contents ≤ 15%	Demineralized Untreated Water	None	None			None
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water	None	None			None
Tanks	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	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-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
Valves	PB	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	None	None			None
	LBS	Copper Alloys with Zinc Contents ≤ 15%	Demineralized Untreated Water	None	None			None
		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
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-B	3.3.1.B-05	A
External Surfaces	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	A
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Fuel Oil without Water Contamination	None	None			None
Tank	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Fuel Oil	Loss of Material	Fuel Oil Chemistry Program One-Time Inspection Program	VII.H1.4-a	3.3.1.B-07	B
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, Moisture or Wetting, temperature <140°F	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
		Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
			Air, Moisture or Wetting, temperature <140°F	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
External Surfaces	PB LBS	Brass	Air	None	None			None
	PB LBS SIA	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	A
	PB LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
	PB LBS SIA	Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
	LBS PB	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None
		Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	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-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
External Surfaces (cont'd)	LBS PB SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
Fire Hydrants	PB	Gray 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	LBS PB	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			H
Halon Tank Flex Hoses	PB	Polymers	Air	Hardening and Shrinkage	Fire Protection Program			H
				Loss of Strength	Fire Protection Program			H
Heat Exchangers	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	C, 6
Hose Reels	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Fire Protection Program			H
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None
Manifold	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	C, 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 3.3.2.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
Nozzles	PB SPR	Brass	Air	None	None			None
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Fire Protection Program			H
			Dried Air or Gas	None	None			None
Odorizers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Dried Air or Gas	None	None			None
			Air	Loss of Material	Fire Protection Program			J
Orifices	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Fire Protection Program			J
		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	One-Time Inspection Program			H
				Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	C, 7
Piping and Fittings	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	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
		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

See Table 2.0-1 for 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)	LBS PB (cont'd)	Wrought Austenitic Stainless Steel	Exhaust	Loss of Material	Fire Protection Program	VII.H2.4-a	3.3.1.B-05	F
	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-a	3.3.1.B-21	A
Pumps	LBS PB	Gray Cast Iron	Liquid Foam Concentrate	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	C
			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
Ratio Flow Proportioner	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	A
Rupture Discs	LBS PB PR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Dried Air or Gas	None	None			None
Silencer	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Exhaust	Loss of Material	Fire Protection Program	VII.H2.4-a	3.3.1.B-05	A
Sprinklers	LBS PB SPR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Fire Protection Program	VII.D.1-a	3.3.1.B-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.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	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Liquid Foam Concentrate	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	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Dried Air or Gas	None	None			None
			Liquid Foam Concentrate	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	C
Temperature Indicators	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	C, 24
Valves	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
			Liquid Foam Concentrate/ Raw Water, Low Flow	Loss of Material	Fire Water system Program	VII.G.6-b	3.3.1.B-21	A
			Raw Water, Low Flow		Fire Water System Program	VII.D.6-a	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-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)	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	A
	PB LBS	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
		Wrought Austenitic Stainless Steel	Raw Water, Low Flow	Cracking	One Time Inspection 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	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
Drain Tank	PB SIA	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program			H
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program			H
External Surfaces	LBS	Aluminum	Air	None	None			None
	PB SIA	Cast Austenitic Stainless Steel	Air	None	None			None
	LBS PB SIA	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	A
	LBS	Grey Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	F
	DF FC LBS PB SIA SPR	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-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	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water	Loss of Material	One-Time Inspection Program			H
			Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	One-Time Inspection Program			H
		Wrought Austenitic Stainless Steel	Raw Water	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			H
Heat Exchanger	NSS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	One-Time Inspection Program			H
Piping and Fittings	PB	Wrought Austenitic Stainless Steel	Air	None	None			None
	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	One-Time Inspection Program			H
		Grey Cast Iron	Air, Moisture or Wetting, temperature <140°F	Loss of Material	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)	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program			H
			Air, Moisture or Wetting, temperature ≥ 140°F	Loss of Material	One-Time Inspection Program			H
		Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
	SIA	Wrought Austenitic Stainless Steel	Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program			H
	PB PH	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program			
			Air, Moisture or Wetting, temperature ≥ 140°F	Loss of Material	One-Time Inspection Program			H
			Fuel Oil	Loss of Material	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 PH (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	Raw Water	Loss of Material	One-Time Inspection Program	VII.C1.1-a	3.3.1.B-17	E
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program			H
		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	Loss of Material	One-Time Inspection Program			J
			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
					One-Time Inspection 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

See Table 2.0-1 for 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
Pumps	LBS	Aluminum	Raw Water	Loss of Material	One-Time Inspection Program			J
	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One Time Inspection			J
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program			J
Orifices	FC PB	Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature ≥ 140°F	Loss of Material	One-Time Inspection Program			J
Spray Nozzle	PB SPR	Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program			J
Strainers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water	Loss of Material	One-Time Inspection Program			H
		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	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature <140°F, Low Flow	Loss of Material	One-Time Inspection Program			H
			Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	One-Time Inspection Program			H
	PB PH	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program			H
			Air, Moisture or Wetting, temperature ≥ 140°F	Loss of Material	One-Time Inspection Program			H
			Fuel Oil	Loss of Material	One-Time Inspection Program			H
			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
			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)	PB PH (cont'd)	Wrought Austenitic Stainless Steel	Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program			H
			Air, Moisture or Wetting, temperature <140°F	Loss of Material	10 CFR 50 Appendix J Program			J
			Air, Moisture or Wetting, temperature ≥ 140°F	Loss of Material	One-Time Inspection Program			J
			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
					One-Time Inspection Program	V.C.1-b	3.2.1.B-05 3.2.1.B-06	A
			Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program			H
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	10 CFR 50 Appendix J Program			H
					One-Time Inspection Program			H
	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program			H
			Air, Moisture or Wetting, temperature ≥ 140°F	Loss of Material	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
Valves (cont'd)	PB PH (cont'd)	Cast Austenitic Stainless Steel	Air, Moisture or Wetting, temperature ≥ 140°F	Loss of Material	One-Time Inspection Program			H
		Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature ≥ 140°F	Loss of Material	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
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-B	3.3.1.B-05	A
External Surfaces	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	A
		Glass	Air	None	None			None
		Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	F
		Wrought Austenitic Stainless Steel	Air	None	None			None
Filters/Strainers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Lubricating Oil	None	None			None
Heat Exchangers	HT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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)	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 (cont'd)	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)	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)	Lubricating Oil	None	None			None
Sight Glasses	PB	Glass	Lubricating Oil	None	None			None
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Lubricating Oil	None	None			None

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
The NMP2 Glycol Heating System has been removed from the scope of license renewal.								

See Table 2.0-1 for 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-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
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-B	3.3.1.B-05	A
External Surfaces	LBS	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	A
Piping and Fittings	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature ≥ 140°F, but < 212°F Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program			H
Valves	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature ≥ 140°F, but < 212°F Treated Water or Steam, temperature ≥ 212°F, but < 482°F	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 3.3.2.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
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
External Surfaces	LBS	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	A
		Wrought Austenitic Stainless Steel	Air	None	None			None
Piping and Fittings	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature <140°F	Loss of Material	Water Chemistry Control Program One Time Inspection Program	VIII.E.1-b	3.4.1.B-02	B
Valves	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	Water Chemistry Control Program One Time Inspection Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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-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
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-B	3.3.1.B-05	A
Bellows	PB	Wrought Austenitic Stainless Steel	Air	None	None			None
External Surfaces	PB	Wrought Austenitic Stainless Steel	Air	None	None			None
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-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
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-B	3.3.1.B-05	A
Debris Screens	FLT	Wrought Austenitic Stainless Steel	Air	None	None			None
External Surfaces	PB SIA	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	A
		Cast Austenitic Stainless Steel	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
Flow Element	SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
Piping and Fittings	PB PH	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material				
					One-Time Inspection Program	VII.F3.4-a	3.3.1.B-05	C, 10
		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
Piping and Fittings (cont'd)	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F3.4-a	3.3.1.B-05	C
		Wrought Austenitic Stainless Steel	Air	None	None			None
Valves	PB PH	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F3.4-a	3.3.1.B-05	C, 2
		Cast Austenitic Stainless Steel	air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F3.4-a	3.3.1.B-05	C
		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-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
Bolting	LBS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cracking	Bolting Integrity Program	VII.I.2-b	3.3.1.B-24	A
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			G
				Loss of Material	Bolting Integrity Program	VII.I.2-a	3.3.1.B-24	A
External Surfaces	LBS	Glass	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
Flow Indicators	LBS	Glass	Treated Water, temperature <140°F, Low Flow	None	None			None
Heat Exchangers	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F, Low Flow	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D, 6
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-04	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-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
Piping and Fittings	LBS PH	Wrought Austenitic Stainless Steel	Air	None	None			None
			Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D, 29
			Treated Water, temperature <140°F, Low Flow	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D, 29
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-04	B, 29
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	One Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	E, 29
Valves	LBS PH	Wrought Austenitic Stainless Steel	Air	None	None			None
			Treated Water, temperature <140°F, Low Flow	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D, 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.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
Valves (cont'd)	LBS PH (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.B-04	B, 29
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	One Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	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.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
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-B	3.3.1.B-05	A
External Surfaces	LBS PB SIA	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	A
	PB	Wrought Austenitic Stainless Steel	Air	None	None			None
Flow Elements	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
Heat Exchangers	SIA NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	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
Unit Coolers	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
	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)	Air	Loss of Material	Bolting Integrity Program	VII.F2.1-a	3.3.1.B-05	A
		Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.F2.1-a	3.3.1.B-05	A
Ducting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F2.1-a	3.3.1.B-05	A
External Surfaces	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	A
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
		Nickel Based Alloys	Air	None	None			None
		Fiberglass	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
Filters/Strainers	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
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	VII.F2.1-a	3.3.1.B-05	C, 11
		Wrought Austenitic Stainless Steel	Air	None	None			None
Piping and Fittings	PB	Fiberglass	Air	Cracking	Preventive Maintenance Program			J
				Loss of Strength	Preventive Maintenance Program			J
		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
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

See Table 2.0-1 for 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)	HT PB (cont'd)	Copper Alloys (Zinc ≤ 15%) (cont'd)	Raw Water (cont'd)	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)	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
			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

See Table 2.0-1 for 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
Valves and Dampers (includes fire dampers)	FB PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F, Leaking Fluid	Cracking	Bolting Integrity Program	VII.I.2-b	3.3.1.B-24	A
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			G
				Loss of Material	Bolting Integrity Program	VII.I.2-a	3.3.1.B-24	A
		Wrought Austenitic Stainless Steel	Air	None	None			None
External Surfaces	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.2.1.B-05	A
		Wrought Austenitic Stainless Steel	Air	None	None			None
Filter	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-a	3.4.1.B-02	D
			Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-a	3.4.1.B-02	D

See Table 2.0-1 for 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	LBS PB PH SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.1-b	3.4.1.B-02	D
			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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	C
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-c	3.1.1.B-25	C, 11
Heat Exchanger	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			H
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-c	3.1.1.B-25	C

See Table 2.0-1 for 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	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	D
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-c	3.1.1.B-25	C
			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
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-c	3.1.1.B-25	C
	PB PH	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	A
				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 PH (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	Treated Water or Steam, temperature ≥ 482°F (cont'd)	Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-c	3.1.1.B-25	A
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	A
				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
				Loss of Material	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 PH (cont'd)	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	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	B, 1
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 3.3.2.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)	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) n	Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.1-b	3.4.1.B-02	B
			Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.1-b	3.4.1.B-02	B
Orifices	LBS FC 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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.B-01	A
Pumps	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.3-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 3.3.2.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 PH	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature ≥ 140°F, but < 212°F	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	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
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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

See Table 2.0-1 for 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 PH (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	Treated Water or Steam, temperature ≥ 482°F, Low Flow (cont'd)	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-d	3.1.1.B-01	A
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program			H, 1
		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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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 PH (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	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
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-d	3.1.1.B-01	A
	SIA LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.2-b	3.3.1.B-05	B
			Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.2-b	3.3.1.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 3.3.2.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
The NMP2 Seal Water System has been removed from the scope of licnese renewal.								

See Table 2.0-1 for 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	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
External Surfaces	LBS PB SIA	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	A
	PB	Cast Austenitic Stainless Steel	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
Filters/Strainers	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.6-a	3.3.1.B-17	A
Flow Elements	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.1-a	3.3.1.B-17	C, 11
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.4-a	3.3.1.B-17	A
Orifices	FC PB	Wrought Austenitic Stainless Steel	Raw Water	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
Piping and Fittings	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
		Wrought Austenitic Stainless Steel	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
Pumps	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.4-a	3.3.1.B-17	C, 16
Temperature Elements	LBS PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.1-a	3.3.1.B-17	C, 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 3.3.2.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	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
	PB	Wrought Austenitic Stainless Steel	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-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
Bolting	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
External Surfaces	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	A
	LBS NSS PB SIA	Cast Austenitic Stainless Steel	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
Filters/Strainers	LBS NSS PB SIA	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.2-a	3.3.1.B-01	B
Flow Elements	LBS PB SIA	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.1-a	3.3.1.B-01	D
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, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.4-b	3.3.1.B-01	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-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
Heat Exchangers (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program	VII.A4.4-a	3.3.1.B-15	A
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program	VII.A4.4-a	3.3.1.B-01	F
			Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.4-b	3.3.1.B-01	B
Orifices	LBS PB SIA	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.1-a	3.3.1.B-01	D
Piping and Fittings	PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.B-03	A
			Treated Water, temperature <140°F, Oxygenated	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, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.1-a	3.3.1.B-01	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-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
Piping and Fittings (cont'd)	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.1-a	3.3.1.B-01	B
Pumps	LBS PB SIA	Cast Austenitic Stainless Steel	Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.6-a	3.3.1.B-01	B
Tanks	LBS PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F, Oxygenated	Loss of Material	one-Time Inspection Program Water Chemistry Control Program	VII.A4.2-a	3.1.1.B-01	D
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.B-03	E
			Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.B-02	B
	SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature <140°F, Oxygenated	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 3.3.2.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
Valves (cont'd)	PB SIA	Cast Austenitic Stainless Steel	Air	None	None			None
			Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.3-a	3.1.1.B-01	B
		Wrought Austenitic Stainless Steel	Air	None	None			None
			Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.3-a	3.1.1.B-01	B
	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F, Oxygenated	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.A4.3-a	3.1.1.B-01	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-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 SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
External Surfaces	PB SIA	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	A
	PB	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
Filters/Strainers	FLT PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Fuel Oil without Water Contamination	None	None			None
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Fuel Oil without Water Contamination	None	None			None
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)	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 (cont'd)	PB (cont'd)	Wrought Austenitic Stainless Steel	Fuel Oil without Water Contamination	None	None			None
			Treated Water, temperature <140°F	None	None			None
Piping and Fittings	PB SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program			G
			Fuel Oil without Water Contamination	None	None			None
	PB	Wrought Austenitic Stainless Steel	Fuel Oil without Water Contamination	None	None			None
Pumps	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Fuel Oil without Water Contamination	None	None			None
Tanks	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 VII.H2.5-a	3.3.1.B-07 3.3.1.B-07	A 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 SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Fuel Oil without Water Contamination	None	None			None
	PB	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)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
External Surfaces	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.E.I.1-b	3.3.1.B-05	A
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None
		Glass or Polymer	Air					
		Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program	VIII.E.I.1-b	3.3.1.B-05	F
		Wrought Austenitic Stainless Steel	Air	None	None			None
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
		Copper Alloys (Zinc ≤ 15%) (cont'd)	Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Heat Transfer	Closed-Cycle Cooling Water 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-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)	HT PB (cont'd)	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			
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	C, 6
		Wrought Austenitic Stainless Steel	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.C1.4-a	3.3.1.B-15	C
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	Closed-Cycle Cooling Water 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-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)	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.B-05	A
			Exhaust	Loss of Material	Preventive Maintenance 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	A
Pumps	PB	Gray Cast Iron	Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C.2.3-a	3.3.1.B-15	A
					Selective Leaching of Materials Program	VII.C.2.3-a	3.3.1.B-15	A
Sight Glass	PB	Glass or Polymer	Treated Water, temperature ≥ 140°F, but < 212°F	None	None			None
Tank	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.4-a	3.3.1.B-15	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-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)	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	VII.C2.2-a	3.3.1.B-15	A
		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			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-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
Bolting	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity	VII.I.1-b	3.3.1.B-05	A
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cracking	Bolting Integrity Program	VII.I.2-b	3.3.1.B-24	A
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)			G
				Loss of Material	Bolting Integrity Program	VII.I.2-a	3.3.1.B-24	A
Expansion Joints	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
External Surfaces	PB	Cast Austenitic Stainless Steel	Air	None	None			None
	LBS NSS PB SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
Filters/Strainers	PB	Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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
Flow Elements	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Orifices	FC PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Piping and Fittings	LBS	Wrought Austenitic Stainless Steel	Sodium Pentaborate Solution	Cracking	Water Chemistry Control Program	VII.E2.1-a	3.3.1.B-25	B
			Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
	PB SIA	Wrought Austenitic Stainless Steel	Sodium Pentaborate Solution	Cracking	Water Chemistry Control Program	VII.E2.1-a	3.3.1.B-25	B
			Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Tanks	LBS NSS PB SIA	Wrought Austenitic Stainless Steel	Sodium Pentaborate Solution	Cracking	Water Chemistry Control Program	VII.E2.2-a	3.3.1.B-25	B
Temperature Elements	PB	Wrought Austenitic Stainless Steel	Sodium Pentaborate Solution	Cracking	Water Chemistry Control Program	VII.E2.1-a	3.3.1.B-25	D
Valves	LBS SIA	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
			Sodium Pentaborate Solution	Cracking	Water Chemistry Control Program	VII.E2.3-a	3.3.1.B-25	B
			Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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	Cast Austenitic Stainless Steel	Sodium Pentaborate Solution	Cracking	Water Chemistry Control Program	VII.E2.3-a	3.3.1.B-25	B
			Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
		Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program			H
			Sodium Pentaborate Solution	Cracking	Water Chemistry Control Program	VII.E2.3-a	3.3.1.B-25	B
			Dried Air or Gas	None	None			None
			Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
			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)	Air	Loss of Material	Preventive Maintenance Program	VII.F2.1-a	3.3.1.B-05	A
Dampers (includes fire dampers)	FB PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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)	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)	Air	Loss of Material	One-Time Inspection Program	VII.F2.1-a	3.3.1.B-05	A
External Surfaces	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	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-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)	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.

Table 3.3.2.B-32 Auxiliary Systems
NMP2 Radiation 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	LBS PB SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Bolting Integrity	VII.I.1-b	3.3.1.B-05	A
External Surfaces	PB	Wrought Austenitic Stainless Steel	Air	None	None			None
Filters	PB FLT	Wrought Austenitic Stainless Steel	Air	None	None			None
Flow Elements	PB FC	Wrought Austenitic Stainless Steel	Raw Water	Loss of Material	Preventive Maintenance Program	VII.C1.4-a	3.3.1.B-17	E
			Air	None	None			None
Piping and Fittings	PB	Wrought Austenitic Stainless Steel	Raw Water	Loss of Material	Preventive Maintenance Program	VII.C1.1-a	3.3.1.B-17	E
			Air	None	None			None
Pumps	PB	Wrought Austenitic Stainless Steel	Raw Water	Loss of Material	Preventive Maintenance Program	VII.C1.4-a	3.3.1.B-17	E
			Air	None	None			None
Valves	PB	Wrought Austenitic Stainless Steel	Raw Water	Loss of Material	Preventive Maintenance Program	VII.C1.2-a	3.3.1.B-17	E
			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-33 Auxiliary Systems
NMP2 Auxiliary Boiler System – Summary of Aging 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	LBS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
		Martensitic, Precipitation Hardened, and Super Ferritic Stainless Steels	Air	None	None			None
External Surfaces	LBS	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	A
		Cast Austenitic Stainless Steel	Air	None	None			None
		Grey Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	F
		Wrought Austenitic Stainless Steel	Air	None	None			None
Filters	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.C.2-b	3.4.1.B-06	D

See Table 2.0-1 for 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-33 Auxiliary Systems NMP2 Auxiliary Boiler System – Summary of Aging 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)	LBS (cont'd)	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	One-Time Inspection Water Chemistry Control Program			J
Heat Exchanger	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.4-d	3.4.1.B-02	B
Piping and Fittings	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Water Chemistry Control Program	VIII.E.1-b	3.4.1.B-02	B
			Treated Water or Steam, temperature ≥ 140°F, but < 212°F	Loss of Material	One-Time Inspection Water Chemistry Control Program	VIII.E.1-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 3.3.2.B-33 Auxiliary Systems NMP2 Auxiliary Boiler System – Summary of Aging 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)	LBS (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi (cont'd)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	Flow Accelerated Corrosion Program	VIII.C.1-a	3.4.1.B-06	A
					One-Time Inspection Water Chemistry Control Program	VIII.C.1-b	3.4.1.B-02	B
		Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Pumps	LBS	Grey Cast Iron	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.3-a	3.4.1.B-06	F
					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.B-33 Auxiliary Systems NMP2 Auxiliary Boiler System – Summary of Aging 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)	LBS (cont'd)	Grey Cast Iron (cont'd)	Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.3-a	3.4.1.B-02	F
					Selective Leaching of Materials Program			J
			Disodium Phosphate Solution, Sodium Sulfite Solution	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			J
Restricting Orifices	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.C.1-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 3.3.2.B-33 Auxiliary Systems
NMP2 Auxiliary Boiler System – Summary of Aging 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	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Treated Water or Steam, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-a	3.4.1.B-02	B
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.C.2-b	3.4.1.B-02	D
			Disodium Phosphate Solution, Sodium Sulfite Solution	Loss of Material	One-Time Inspection 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-33 Auxiliary Systems
NMP2 Auxiliary Boiler System – Summary of Aging 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	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.2-b	3.4.1.B-02	B
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Treated Water, temperature ≥ 140°F, but < 212°F	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 ≥ 212°F, but < 482°F	Loss of Material	Flow Accelerated Corrosion Program	VIII.C.2-a	3.4.1.B-06	A
					One-Time Inspection Program Water Chemistry Control Program	VIII.C.2-b	3.4.1.B-02	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-33 Auxiliary Systems
NMP2 Auxiliary Boiler System – Summary of Aging 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)	LBS (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi (cont'd)	Disodium Phosphate Solution, Sodium Sulfite Solution	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			J
		Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	One-Time Inspection Water Chemistry Control Program			J
			Disodium Phosphate Solution, Sodium Sulfite Solution	None	None			None
		Cast Austenitic Stainless Steel	Sodium Sulfite 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-34 Auxiliary Systems
NMP2 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
Bolting	LBS SIA	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
External Surfaces	LBS SIA	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	A
Piping and Fittings	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C3.1-a	3.3.1.B-17	A
Valves	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	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-35 Auxiliary Systems
NMP2 Makeup Water 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
Bolting	LBS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	
External Surfaces	LBS	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	A
Piping and Fittings	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Water Chemistry Control Program	VIII.E.6-a	3.4.1.B-02	B
Valves	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Water Chemistry Control Program	VIII.E.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 3.3.2.B-36 Auxiliary Systems
NMP2 Radioactive Liquid Waste Management System – Summary of Aging 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	LBS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
		Martensitic, Precipitation Hardened, and Super Ferritic Stainless Steels	Air	None	None			None
External Surfaces	LBS	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	A
		Cast Austenitic Stainless Steel	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
Filters	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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-36 Auxiliary Systems
NMP2 Radioactive Liquid Waste Management System – Summary of Aging 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	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Water Chemistry Control Program	VIII.E.1-b	3.4.1.B-02	B
		Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Pump	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Restricting Orifice	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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-36 Auxiliary Systems
NMP2 Radioactive Liquid Waste Management System – Summary of Aging 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	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	B
Valves	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Water Chemistry Control Program	VIII.E.2-b	3.4.1.B-02	B
		Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
		Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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-37 Auxiliary Systems
NMP2 Roof Drainage System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
External Surfaces	LBS	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	A
Piping and Fittings	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Raw Water	Loss of Material	One Time Inspection	VII.C1.1-a		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-38 Auxiliary Systems
NMP2 Sanitary Drains and Disposal System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
External Surfaces	LBS	Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
		Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	F
		Wrought Austenitic Stainless Steel	Air	None	None			None
Piping and Fittings	LBS	Copper Alloys (Zinc ≤ 15%)	Demineralized Untreated Water	None	None			None
		Gray Cast Iron	Demineralized Untreated Water	Loss of Material	One-Time Inspection Program Selective Leaching of Materials Program			J
		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-39 Auxiliary Systems
NMP2 Service Water Chemical 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
Bolting	LBS SIA	Martensitic, Precipitation Hardened, and Super Ferritic Stainless Steels	Air	None	None			None
External Surfaces	LBS SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
Piping and Fittings	LBS SIA	Wrought Austenitic Stainless Steel	Service Water Chemical Treatment Water	Loss of Material	One Time Inspection Program			J
Valves	LBS SIA	Wrought Austenitic Stainless Steel	Service Water Chemical Treatment Water	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-40 Auxiliary Systems
NMP2 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
Bolting	LBS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	A
External Surfaces	LBS	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	A
Heat Exchangers	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.4-a	3.3.1.B-15	C
Piping and Fittings	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.1-a	3.3.1.B-15	A
Valves	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.2-a	3.3.1.B-15	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.

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 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)
- NMP1 Main Turbine and Auxiliary System (Section 2.3.4.A.6)
- NMP1 Moisture Separator Reheater Steam System (Section 2.3.4.A.7)

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)
- NMP2 Extraction Steam and Feedwater Heater Drain System (Section 2.3.4.B.6)

- NMP2 Turbine Main System (Section 2.3.4.B.7)

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

- Table 3.4.2.A-5 Steam and Power Conversion System - NMP1 Condenser Air Removal and Off-Gas System – Summary of Aging Management Evaluation

- Table 3.2.A-6 Steam and Power Conversion System - NMP1 Main Turbine and Auxiliary System – Summary of Aging Management Evaluation

- Table 3.2.A-7 Steam and Power Conversion System - NMP1 Moisture Separator Reheater 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
- Table 3.4.2.B-6 Steam and Power Conversion System - NMP2 Extraction Steam and Feedwater Heater Drain System – Summary of Aging Management Evaluation
- Table 3.4.2.B-7 Steam and Power Conversion System - NMP2 Turbine Main 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 and Condensate Transfer 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
- Section 3.4.2.A.5, NMP1 Condenser Air Removal and Off-Gas System
- Section 3.4.2.A.6 NMP1 Main Turbine and Auxiliary System
- Section 3.4.2.A.7 NMP1 Moisture Separator Reheater 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
- Section 3.4.2.B.6, NMP2 Extraction Steam and Feedwater Heater Drain System
- Section 3.4.2.B.7, NMP2 Turbine Main System

3.4.2.A NMP1 MATERIALS, ENVIRONMENTS, AGING EFFECTS REQUIRING MANAGEMENT AND AGING MANAGEMENT PROGRAMS

3.4.2.A.1 NMP1 CONDENSATE AND CONDENSATE TRANSFER 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
- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)

- 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:

- Bolting Integrity Program
- Flow-Accelerated Corrosion Program
- 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:

- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)
- 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, Leaking Fluid
- 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

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Feedwater/High Pressure Coolant Injection System, require management:

- Cracking
- Cumulative Fatigue Damage
- 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:

- Bolting Integrity Program
- Closed-Cycle Cooling Water System 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)

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:

- Bolting Integrity Program
- 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:

- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)
- 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, Leaking Fluid
- 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
- Cumulative Fatigue Damage
- 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
- Bolting Integrity Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.4.2.A.5 NMP1 CONDENSER AIR REMOVAL AND OFF-GAS SYSTEM

Material

The material of construction for the NMP1 Condenser Air Removal and Off-Gas System components is:

- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)

Environments

The NMP1 Condenser Air Removal and Off-Gas System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Condenser Air Removal and Off-Gas System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Condenser Air Removal and Off-Gas System components:

- Bolting Integrity Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.4.2.A.6 NMP1 MAIN TURBINE AND AUXILIARY SYSTEM

Material

The material of construction for the NMP1 Main Turbine and Auxiliary System components is:

- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)

Environments

The NMP1 Main Turbine and Auxiliary System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Systems with operating temperatures ≥ 212°F, Leaking Fluid
- Lubricating Oil
- Treated Water or Steam, temperature ≥ 482°F

Aging Effects Requiring Management

The following aging effects, associated with the Main Turbine and Auxiliary System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for Main Turbine and Auxiliary System components:

- Bolting Integrity Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Systems Walkdown Program

- Water Chemistry Control Program

3.4.2.A.7 NMP1 MOISTURE SEPARATOR REHEATER STEAM SYSTEM

Material

The material of construction for the NMP1 Moisture Separator Reheater Steam System components is:

- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)

Environments

The NMP1 Moisture Separator Reheater Steam System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid
- Treated Water or Steam, temperature ≥ 482°F

Aging Effects Requiring Management

The following aging effects, associated with the Moisture Separator Reheater Steam System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for Moisture Separator Reheater Steam System components:

- Bolting Integrity 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:

- Bronze
- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)

Environments

The NMP2 Main Condenser Air Removal System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Systems with operating temperatures ≥ 212°F, Leaking Fluid
- 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:

- Bolting Integrity Program

- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- 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:

- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)
- Elastomer
- Fiberglass
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Condensate System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Systems with operating temperatures ≥ 212°F, Leaking Fluid
- Treated Water, temperature < 140°F
- 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 Condensate System, require management:

- Cracking
- Loss of Material
- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Condensate System components:

- Bolting Integrity Program
- Flow-Accelerated Corrosion Program
- 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:

- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)

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, Leaking Fluid
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the Feedwater System, require management:

- Cracking
- Cumulative Fatigue Damage
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Feedwater System components:

- Bolting Integrity 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:

- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)
- 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, Leaking Fluid
- Demineralized Untreated Water, Low Flow
- 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 NMP2 Main Steam System, require management:

- Cracking
- Cumulative Fatigue Damage
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Main Steam System components:

- Bolting Integrity 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:

- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)

Environments

The NMP2 Moisture Separator and Reheater System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid
- Treated Water or Steam, temperature ≥ 212°F, but < 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:

- Bolting Integrity Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.4.2.B.6 NMP2 EXTRACTION STEAM AND FEEDWATER HEATER DRAIN SYSTEM

Material

The material of construction for the NMP2 Extraction Steam and Feedwater Heater Drain System components is:

- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)

Environments

The NMP2 Extraction Steam and Feedwater Heater Drain System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Extraction Steam and Feedwater Heater Drain System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Extraction Steam and Feedwater Heater Drain components:

- Bolting Integrity Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.4.2.B.7 NMP2 TURBINE MAIN SYSTEM

Material

The material of construction for the NMP2 Turbine Main System components is:

- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)

Environments

The NMP2 Turbine Main System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid
- Treated Water or Steam, temperature ≥ 482°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Turbine Main System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Turbine Main components:

- Bolting Integrity Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection 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	Consistent with NUREG-1801. The reactor coolant pressure boundary portions of the NMP1 Main Steam and Feedwater/High Pressure Coolant Injection piping and fittings and valves with this aging effect/mechanism are evaluated in row 3.1.1.A-01. Piping and fittings and valves 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 • Feedwater Heaters • Condensing Pots 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: • Air Ejectors • Filters/strainers • Flow Gauges • Flow Elements • Flow Indicators • Flow Orifices • Regulators • Separators 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. Additionally, closure bolting in low-pressure and low temperature systems are consistent with, but not addressed in, NUREG-1801. Further evaluation is documented in Appendix B2.1.33 (Systems Walkdown Program).

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-06	Carbon steel piping and valve bodies	Wall thinning due to flow-accelerated corrosion	Flow-Accelerated Corrosion	No	Consistent with NUREG-1801. The reactor coolant pressure boundary portions of the Main Steam and Feedwater/High Pressure Coolant Injection piping, fittings and valves with this aging effect/mechanism are evaluated in row 3.1.1.A-25. Additionally, the following components are consistent with, but not addressed, in NUREG-1801: • Flow elements • Flow orifices
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	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2). NMP1 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.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	Consistent with NUREG-1801.,
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.

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-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.
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	Consistent with NUREG-1801.The reactor coolant pressure boundary portions of the NMP2 Main Steam and Feedwater piping and fittings and valves with this aging effect/mechanism are evaluated in row 3.1.1.B-01. Piping and fittings and valves 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 with exceptions (see Appendix B2.1.2, Water Chemistry Control Program). Additionally, the following components are consistent with, but not addressed, in NUREG-1801: • Flow elements • Flow orifices • Restriction Orifices • Strainers 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				

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-05	External surface of carbon steel components	Loss of material due to general corrosion	Plant Specific	Yes, plant specific	Consistent with NUREG-1801. Additionally, closure bolting in low-pressure and low-temperature systems in consistent with, but not addressed in, NUREG-1801. Further evaluation is documented in Appendix B2.1.33 (Systems Walkdown Program).
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. The reactor coolant pressure boundary portions of the NMP2 Feedwater and Main Steam piping, fittings and valves with this aging effect/mechanism are evaluated in row 3.1.1.B-25. .
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	Consistent with NUREG-1801.
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.

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-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.
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	Above ground 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
Bolting	PB LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VIII.H.1-b	3.4.1.A-05	C,11
External Surfaces	LBS	Glass	Air	None	None			None
	LBS PB	Aluminum alloys containing copper or zinc as the primary alloying elements	Air	None	None			None
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
		Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.A-05	F
	LBS PB SIA	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.A-05	A, 1
		Wrought Austenitic Stainless Steel	Air	None	None			None
	LBS SIA	Polymers	Air	Cracking Loss of Strength	Systems Walkdown Program			J
	PB	Cast 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 3.4.2.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	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
Flow Elements	PB LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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
Flow Gauges	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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

See Table 2.0-1 for 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 Indicators	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
Flow Orifices	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
Level Observation Glasses	LBS	Glass	Treated Water, temperature < 140°F, Low Flow	None	None			None
Main Condenser	PB LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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
Piping and Fittings	LBS SIA	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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
					Flow-Accelerated Corrosion Program	VIII.E.1-a	3.4.1A-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 3.4.2.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)	LBS SIA (cont'd)	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	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
	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			F
		Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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
					Flow-Accelerated Corrosion Program	VIII.E.1-a	3.4.1A-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 3.4.2.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)	PB (cont'd)	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
Pumps	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	B
Valves	LBS	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			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 3.4.2.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)	LBS (cont'd)	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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
					Flow-Accelerated Corrosion Program	VIII.E.2-a	3.4.1A-06	A
			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
		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

See Table 2.0-1 for 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)	LBS (cont'd)	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
	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			F
		Aluminum alloys containing copper or zinc as the primary alloying elements (cont'd)	Treated Water, temperature < 140°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program			F
		Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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
					Flow-Accelerated Corrosion Program	VIII.E.2-a	3.4.1A-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 3.4.2.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 (cont'd)	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	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	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
		Copper Alloys (Zinc ≤ 15%)	Treated Water, temperature < 140°F	None	None			None
		Copper Alloys (Zinc ≤ 15%) (cont'd)	Treated Water, temperature < 140°F, Low Flow	None	None			None
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D

See Table 2.0-1 for 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	LBS PB SIA	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.A-08	A
				Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.A-08	A
External Surfaces	LBS PB SIA	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.A-05	A, 1
	LBS NSS PB SIA	Wrought Austenitic Stainless Steel	Air	None	None			None
	PB	Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
Feedwater Heaters	LBS NSS PB SIA	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.A-02	D

See Table 2.0-1 for 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)	LBS NSS PB SIA (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program Water Chemistry Control Program			J
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with10 CFR 54.21(c)			J
				Cracking	One-Time Inspection Program Water Chemistry Control Program			J
Filters/Strainers	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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

See Table 2.0-1 for 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 Elements (cont'd)	PB (cont'd)	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with10 CFR 54.21(c)	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
Flow Indicators	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with10 CFR 54.21(c)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with10 CFR 54.21(c)	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
Oil Coolers	PB	Copper Alloys (Zinc ≤ 15%)	Demineralized Untreated Water, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program			J
			Lubricating Oil	None	None			None
Piping and Fittings	LBS SIA	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Lubricating Oil	None	None			None
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CRF 54.21(c)	VIII.D2.1-c	3.4.1.A-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	VIII.D2.1-a	3.4.1.A-06	A
				Loss of Material (cont'd)	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.1-b	3.4.1.A-02	B
	PB PH	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-d	3.1.1.A-01	A, 16
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-c	3.1.1.A-25	A, 16
					One-Time Inspection Program Water Chemistry Control Program			H, 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 3.4.2.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	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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	LBS SIA	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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)	LBS SIA (cont'd)	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
					One-Time Inspection Program Water Chemistry Control Program	VIII.D2.2-a	3.4.1.A-02	B
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-d	3.1.1.A-01	A, 16
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.3-a	3.1.1.A-25	A, 16
				Loss of Material (cont'd)	One-Time Inspection Program Water Chemistry Control Program			H, 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 3.4.2.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 (cont'd)	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-d	3.1.1.A-01	A, 16
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program			H, 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 3.4.2.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	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VIII.H.1-b	3.4.1.A-05	A,11
External Surfaces	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.A-05	A, 1
Piping and Fittings	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Dried Air or Gas	None	None			None
Tanks	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Dried Air or Gas	None	None			None
Valves	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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 LBS SIA	Carbon Steel, Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.A-08	A
				Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.A-08	A
External Surfaces	PB LBS SIA	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.A-05	A, 1
		Wrought Austenitic Stainless Steel	Air	None	None			None
		Nickel Based Alloys	Air	None	None			None
Condensing Pots	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.A-01	C, 8
				Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D

See Table 2.0-1 for 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
Flow Elements	PB PH	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	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
Piping and Fittings	LBS SIA	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Loss of Material	Water Chemistry Control Program	VIII.B2.1-a	3.4.1.A-07	B
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	VIII.B2.1-c	3.4.1.A-01	A
	PB PH	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	V.D.2.1-e	3.2.1.A-03	A
			Demineralized Untreated Water, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D.2.1-e	3.2.1.A-02	B
			Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-b	3.1.1.A-01	A, 16
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-a	3.1.1.A-25	A, 16
					Water Chemistry Control Program	VIII.B2.1-a	3.4.1.A-07	B, 16
		Nickel Based Alloys	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 3.4.2.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 (cont'd)	PB PH (cont'd)	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-h	3.1.1.A-01	A, 16
				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,16
Valves	LBS	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-f	3.1.1.B-29	D
	LBS PB PH SIA	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-d	3.1.1.A-01	A, 16
						VIII.B2.1-c	3.4.1.A-01	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 3.4.2.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 (cont'd)	LBS PB PH SIA (cont'd)	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	Treated Water or Steam, temperature ≥ 482°F (cont'd)	Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.3-a	3.1.1.A-25	A, 16
						VIII.B2.2-a	3.4.1.A-06	A
					Water Chemistry Control Program			H, 16
						VIII.B2.2-b	3.4.1.A-07	B
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-d	3.1.1.A-01	A,16
				Loss of Material	Water Chemistry Control Program	VIII.B2.2-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-07	E, 16
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-d	3.1.1.A-01	A, 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 3.4.2.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 (cont'd)	LBS SIA	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.A-07	E, 16
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-d	3.1.1.A-01	A, 16
Y-quenchers	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water, Low Flow	Loss of Material	One Time Inspection Program	V.D.2.1-e	3.2.1.A-03 3.2.1.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 3.4.2.A-5 Steam and Power Conversion System
NMP1 Condenser Air Removal and Off-Gas System – Summary of Aging 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 Ejectors	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.C.1-b	3.4.1.A-02	D
				Loss of Material	Flow-Accelerated Corrosion Program	VIII.C.1-a	3.4.1.A-06	D
Bolting	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212 F, Leaking Fluid	Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.A-08	A
				Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.A-08	A
External Surfaces	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.A-05	A, 1
Heat Exchanger	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.C.1-b	3.4.1.A-02	D

See Table 2.0-1 for 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-5 Steam and Power Conversion System
NMP1 Condenser Air Removal and Off-Gas System – Summary of Aging 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	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ks)	Treated Water or Steam, temperature ≥ 212°F but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.C.1-b	3.4.1.A-02	B
					Flow-Accelerated Corrosion Program	VIII.C.1-a	3.4.1.A-06	A
Valves	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ks)	Treated Water or Steam, temperature ≥ 212°F but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.C.2-b	3.4.1.A-02	B
					Flow-Accelerated Corrosion Program	VIII.C.2-a	3.4.1.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 3.4.2.A-6 Steam and Power Conversion System
NMP1 Main Turbine and Auxiliary 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	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.A-08	A
				Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.A-08	A
External Surfaces	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.A-05	A, 1
Heat Exchanger	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ks)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.A-02	D
Piping and fittings	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ks)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.A-02	B
					Flow-Accelerated Corrosion Program	VIII.A.1-a	3.4.1.A-06	A
			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-6 Steam and Power Conversion System
NMP1 Main Turbine and Auxiliary 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
Regulator	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ks)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.2-b	3.4.1.A-02	D
Valves	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ks)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.2-b	3.4.1.A-02	B
					Flow-Accelerated Corrosion Program	VIII.A.2-a	3.4.1.A-06	A
			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-7 Steam and Power Conversion System
NMP1 Moisture Separator Reheater 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	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.A-08	A
				Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.A-08	A
External Surfaces	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.A-05	A, 1
Flow Element	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ks)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.A-02	D, 3
Flow Orifices	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ks)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.A-02	D, 5
Heat Exchanger	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ks)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.A-02	D

See Table 2.0-1 for 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-7 Steam and Power Conversion System
NMP1 Moisture Separator Reheater 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	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ks)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.A-02	B
					Flow-Accelerated Corrosion Program	VIII.A.1-a	3.4.1.A-06	A
Separator	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ks)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.A-02	D
Strainer	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ks)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.A-02	D, 4
Tanks	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ks)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.A-02	D
Valves	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ks)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.2-b	3.4.1.A-02	B
					Flow-Accelerated Corrosion Program	VIII.A.2-a	3.4.1.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 3.4.2.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
Air Ejectors	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.C.1-b	3.4.1.B-02	D
Bolting	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212 F, Leaking Fluid	Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.B-08	A
				Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.B-08	A
External Surfaces	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.B-05	A, 1
Piping and fittings	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ks)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.1-b	3.4.1.B-02	B
					Flow-Accelerated Corrosion Program	VIII.E.1-a	3.4.1.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 3.4.2.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
Valves	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ks)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.2-b	3.4.1.B-02	B
					Flow-Accelerated Corrosion Program	VIII.E.1-a	3.4.1.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 3.4.2.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
Bolting	LBS PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212 F, Leaking Fluid	Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.B-08	A
				Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.B-08	A
External Surfaces	LBS	Elastomer	Air	Cracking Loss of Strength	Preventive Maintenance Program			J
	LBS PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.B-05	A, 1
		Fiberglass	Air	Cracking Loss of Strength	Systems Walkdown Program			H, 13
		Wrought Austenitic Stainless Steel	Air	None	None			None
Flow Element	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.1-b	3.4.1.B-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.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
Heat Exchanger	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.1-b	3.4.1.B-02	D
Main Condenser	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.4-a	3.4.1.B-02	B
Piping and Fittings	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.1-b	3.4.1.B-02	B
					Flow-Accelerated Corrosion Program	VIII.E.1-a	3.4.1-06	A
		Elastomer	Treated Water, temperature < 140°F	Cracking	Preventive Maintenance Program			J
				Loss of Strength	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 3.4.2.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
Piping and Fittings (cont'd)	LBS (cont'd)	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
Pump	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.E.3-a	3.4.1.B-02	B
Restriction Orifice	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.1-b	3.4.1.B-02	D, 10
Tanks	PB LBS	Fiberglass	Treated Water, temperature < 140°F, Low Flow	Cracking	One-Time Inspection Program			J
				Loss of Strength	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 3.4.2.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
Valves	LBS	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature < 140°F	Loss of Material	Flow-Accelerated Corrosion Program	VIII.E.2-a	3.4.1.B-06	A
					One-Time Inspection Program Water Chemistry Control Program	VIII.E.2-b	3.4.1.B-02	B
	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D

See Table 2.0-1 for 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	LBS PB SIA	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.B-08	A
				Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.B-08	A
External Surfaces	LBS PB SIA	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.B-05	A, 1
Flow Element	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.1-b	3.4.1.B-02	D, 3
Heat Exchanger	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.1-b	3.4.1.B-02	D

See Table 2.0-1 for 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
Piping and Fittings	LBS PB PH SIA	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	VIII.D2.1-c	3.4.1.B-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	VIII.D2.1-a	3.4.1.B-06	A
					Water Chemistry Control Program One-Time Inspection Program	VIII.D2.1-b	3.4.1.B-02	B
	PB PH	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212 F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.1-d	3.1.1.B-01	A, 16
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-c	3.1.1.B-25	A, 16
Pump	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.3-b	3.4.1.B-02	B
				Loss of Material	Flow-Accelerated Corrosion Program	VIII.D2.3-a	3.4.1.B-06	A
Restriction Orifice	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.1-b	3.4.1.B-02	D, 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 3.4.2.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
Strainer	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.1-b	3.4.1.B-02	D, 4
Valves	LBS PB PH SIA	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 50.54.21(c)	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
					Flow-Accelerated Corrosion Program	VIII.D2.2-a	3.4.1.B-06	A
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 50.54.21(c)	IV.C1.3-d	3.1.1.B-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	VIII.D2.2-a	3.4.1.B-06	A
					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 PH	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-d	3.1.1.B-01	A, 16
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.3-a	3.1.1.B-25	A, 16
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	IV.C1.3-d	3.1.1.B-01	A, 16
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.3-a	3.1.1.B-25	A, 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 3.4.2.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
Bolting	LBS PB SIA	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.A-08	A
				Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.A-08	A
External Surfaces	LBS PB SIA	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.B-05	A, 1
		Wrought Austenitic Stainless Steel	Air	None	None			None
Condensing Chambers	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	One Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	D, 9
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21 (c)	IV.C1.1-h	3.1.1.B-01	C, 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 3.4.2.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
Flexible Hose	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21 (c)	V.D.2.1-b	3.2.1.B-01	A
				Cracking	One Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D
Flow Elements	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	Flow-Accelerated Corrosion Program	VIII.A.1-a	3.4.1.B-06	C, 3
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.B-02	D, 3
	PB PH	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21 (c)	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
Piping and Fittings	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water, temperature < 140°F, Low Flow	Loss of Material	Water Chemistry Control Program One-Time Inspection Program	VIII.E.1-b	3.4.1.B-02	B
			Treated Water or Steam, temperature ≥ 482°F	Loss of Material	Water Chemistry Control Program	VIII.B2.1-a	3.4.1.B-07	B
					Flow-Accelerated Corrosion Program	VIII.B2.1-b	3.4.1.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 3.4.2.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 (cont'd)	LBS SIA (cont'd)	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	Treated Water or Steam, temperature ≥ 482°F (cont'd)	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21 (c)	VIII.B2.1-c	3.4.1.B-01	A
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Loss of Material	Water Chemistry Control Program	VIII.B2.1-a	3.4.1.B-07	B
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21 (c)	VIII.B2.1-c	3.4.1.B-01	A
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	Water Chemistry Control Program One-Time Inspection Program	VIII.E.5-b	3.4.1.B-02	D
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Water Chemistry Control Program One-Time Inspcetion Program	IV.C1.1-i	3.1.1.B-07	B
	PB PH	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	One-Time Inspection Program	V.D.2.1-e	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 3.4.2.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 (cont'd)	PB PH (cont'd)	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) (cont'd)	Treated Water or Steam, temperature ≥ 482°F	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21 (c)	IV.C1.1-b	3.1.1.B-01	A, 16
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-a	3.1.1.B-25	A, 16
					Water Chemistry Control Program	VIII.B2-1-a	3.4.1.B-07	B, 16
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21 (c)	IV.C1.1-b	3.1.1.B-01	A, 16
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.B2.1-a	3.4.1.B-07	E, 16
		Wrought Austenitic Stainless Steel	Air	None	None			None
			Demineralized Untreated Water, Low Flow	Loss of Material	One-Time Inspection Program			H, 14

See Table 2.0-1 for 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 (cont'd)	PB PH (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	One Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	B, 16
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21 (c)	IV.C1.1-h	3.1.1.B-01	A, 16
Restriction Orifices	FC LBS PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	One Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	D, 10
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21 (c)	IV.C1.1-h	3.1.1.B-01	C, 10
Strainers	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.B2.1-a	3.4.1.B-02	D, 4
"T" Quenchers	PB	Wrought Austenitic Stainless Steel	Demineralized Untreated Water, Low Flow	Loss of Material	One-Time Inspection Program			H, 14

See Table 2.0-1 for 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	LBS SIA	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	Loss of Material	Flow-Accelerated Corrosion Program	VIII.B2.2-a	3.4.1.B-06	A
					One-Time Inspection Program Water Chemistry Control Program	VIII.B2.2-b	3.4.1.B-02	B
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.B2.2-b	3.4.1.B-02	B
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.5-b	3.4.1.B-02	D
			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-07	D

See Table 2.0-1 for 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 PH	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	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	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21 (c)	IV.C1.3-d	3.1.1.B-01	A, 16
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.3-a	3.1.1.B-25	A, 16
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21 (c)	IV.C1.3-d	3.1.1.B-01	A, 16
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.B2.2-b	3.4.1.B-07	B, 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 3.4.2.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 PH (cont'd)	Wrought Austenitic Stainless Steel	Air	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	B, 16
				Cumulative Fatigue Damage	TLAA, evaluated in accordance with 10 CFR 54.21 (c)	IV.C1.3-d	3.1.1.B-01	A, 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 3.4.2.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
Bolting	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.B-08	A
				Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.B-08	A
External Surfaces	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.B-05	A, 1
Heat Exchangers	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.B-02	D
Piping and fittings	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	Flow-Accelerated Corrosion Program	VIII.A.1-a	3.4.1.B-06	A
					One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-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-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
Restriction Orifice	FC LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.B-02	D, 10
Strainers	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.B-02	D, 4
Tanks	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.B-02	D
Valves	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	Flow-Accelerated Corrosion Program	VIII.A.2-a	3.4.1.B-06	A
					One-Time Inspection Program Water Chemistry Control Program	VIII.A.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-6 Steam and Power Conversion System
NMP2 Extraction Steam and Feedwater Heater Drain System – Summary of Aging 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	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.A-08	A
				Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.A-08	A
External Surfaces	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.B-05	A, 1
Heat Exchangers	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.C.1-b	3.4.1.B-02	D
Piping and Fittings	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	Flow-Accelerated Corrosion Program	VIII.C.1-a	3.4.1.B-06	A
					One-Time Inspection Program Water Chemistry Control Program	VIII.C.1-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-6 Steam and Power Conversion System
NMP2 Extraction Steam and Feedwater Heater Drain System – Summary of Aging 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	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.C.1-b	3.4.1.B-02	D
Tanks	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.C.1-b	3.4.1.B-02	D
Valves	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Loss of Material	Flow-Accelerated Corrosion Program	VIII.C.2-a	3.4.1.B-06	A
					One-Time Inspection Program Water Chemistry Control Program	VIII.C.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-7 Steam and Power Conversion System
NMP2 Turbine Main System – Summary of Aging 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	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F, Leaking Fluid	Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.A-08	A
				Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.B-08	A
External Surfaces	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.B-05	A, 1
Heat Exchangers	LBS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.B-02	D
Piping and fittings	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	Flow-Accelerated Corrosion Program	VIII.A.1-a	3.4.1.B-06	A
					One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-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-7 Steam and Power Conversion System
NMP2 Turbine Main System – Summary of Aging 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 Orifice	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.B-02	D, 10
Tank	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.A.1-b	3.4.1.B-02	D
Valve	LBS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Treated Water or Steam, temperature ≥ 482°F	Loss of Material	Flow-Accelerated Corrosion Program	VIII.A.2-a	3.4.1.B-06	A
					One-Time Inspection Program Water Chemistry Control Program	VIII.A.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.

Notes for Tables 3.4.2.A-1 through 3.4.2.B-7:

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.

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 fiberglass.
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.
16. This row applies to components in the reactor coolant pressure boundary portion of the Main Steam or Feedwater Systems.

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:

- Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Coating
- Concrete
- Copper Alloys (Zinc <15%)
- Nickel Based Alloy
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Primary Containment Structure components are exposed to the following environments:

- Air
- Air, cyclic loading
- Air, relative motion between components
- Concrete
- Demineralized Untreated Water, low flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Primary Containment Structure, require management:

- Cracking
- Delamination
- Loss of Anchor Capacity
- Loss of Leak Tightness
- Loss of Material
- Loss of Sealing

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
- Protective Coating Monitoring and Maintenance 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:

- Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Carbon or Low Alloy Steel (Yield Strength > 100 Ksi)
- Concrete
- Masonry Walls
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Reactor Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Concrete
- Soil, above the water table
- Soil, below the water table
- Treated Water, temperature < 140°F, low flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Reactor Building, require management:

- Cracking
- Loss of Anchor Capacity
- Loss of Material
- Loss of Sealing

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
- Fire Protection Program
- Masonry Wall Program
- Structures Monitoring Program
- Water Chemistry Control 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)
- Concrete
- Polymers
- Wood

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 Material Properties
- 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:

- Boraflex
- Boral
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Fuel Handling System components are exposed to the following environments:

- Air
- 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 Fuel Handling System, require management.

- Change in Dimension
- Cracking
- Loss of Material
- Loss of Neutron Absorbing Capacity

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Fuel Handling System components:

- Boraflex Monitoring Program
- Inspection of Overhead Heavy Load and Light Load Handling Systems
- Water Chemistry Control Program

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)
- 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)
- 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
- Concrete
- 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)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Concrete
- Masonry Walls
- Polymers
- Wrought Austenitic Stainless Steel

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
- Loss of Material
- Loss of Sealing

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)
- Concrete
- Masonry Walls

Environments

The NMP1 Screen and Pump House Building components are exposed to the following environments:

- Air
- Air, relative motion between components

- Concrete
- 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)
- Concrete
- Gray Cast Iron
- Masonry Walls

- Polymers

Environments

The NMP1 Turbine Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Concrete
- 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
- Loss of Sealing

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)
- Concrete
- Polymers

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
- Loss of Sealing

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)
- 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
- Concrete
- 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
- Loss of Anchor Capacity
- Loss of Material
- Loss of Sealing

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:

- Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Coating
- Concrete
- Copper Alloys (Zinc ≥ 15%) and Aluminum Bronze
- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels
- Polymers
- 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
- Delamination
- Loss of Leak Tightness
- Loss of Material
- Loss of Sealing

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
- Protective Coating Monitoring and Maintenance Program
- Structures Monitoring Program

3.5.2.B.2 NMP2 REACTOR BUILDING

Materials

The materials of construction for the NMP2 Reactor Building components are:

- Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Concrete
- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Reactor Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Concrete
- Soil, above the water table
- Soil, below the water table
- Treated Water, temperature < 140°F, low flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Reactor Building, require management:

- Cracking
- Loss of Anchor Capacity
- Loss of Material
- Loss of Sealing

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Reactor Building components:

- Fire Protection Program
- Structures Monitoring Program
- Water Chemistry Control 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)
- Concrete
- Polymers

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
- Loss of Sealing

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)
- Concrete
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Control Room Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Concrete
- 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
- Loss of Sealing

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)

- Concrete
- Gray Cast Iron
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Diesel Generator Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Concrete
- 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:

- Loss of Anchor Capacity
- Loss of Material
- Loss of Sealing

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:

- Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Concrete
- Earth
- Gray Cast Iron
- Polymers
- 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
- Concrete
- 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:

- Loss of Anchor Capacity
- Loss of Form
- Loss of Material
- Loss of Material Properties
- Loss of Sealing

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:

- Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Boraflex
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Fuel Handling System components are exposed to the following environments:

- Air
- 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 Fuel Handling System, require management:

- Change in Dimensions
- Cracking
- Loss of Material
- Loss of Neutron Absorbing Capacity

Aging Management Programs

The following aging management programs manage the aging effect for the NMP2 Fuel Handling System components:

- Boraflex Monitoring Program
- Inspection of Overhead Heavy Load and Light Load Handling Systems Program
- Structures Monitoring Program
- Water Chemistry Control 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)
- Concrete
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Main Stack components are exposed to the following environments:

- Air
- Concrete
- 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
- Loss of Sealing

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)

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)
- Concrete
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Radwaste Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Concrete
- 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
- Loss of Sealing

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)
- 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 Sealing

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)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Concrete
- Polymers

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
- Loss of Sealing

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)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Concrete

- Masonry Walls
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Turbine Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Concrete
- 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
- Loss of Sealing

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[2]

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)
- 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
- Concrete

[2] The information in this section applies to NMP1 and NMP2, unless specifically noted.

- Soil, above the water table (NMP2 only)
- Treated Water, temperature < 140°F, low flow

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
- Bolting Integrity Program
- Structures Monitoring Program
- Water Chemistry Control Program

3.5.2.C.2 FIRE STOPS AND SEALS

Materials

The materials of construction for the Fire Stops and Seals components are:

- Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon (NMP1 only)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (NMP2 only)

- Fire Stop
- Fire Wrap
- 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

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.

- Torus Shell and Vent System Tatigue Analysis (NMP1 only) (Section 4.6.1)
- Torus Attached Piping Analysis (NMP1 only) (Section 4.6.2)
- Torus Wall Thickness (NMP1 only) (Section 4.6.3)

- Containment Liner Analysis (NMP2 only) (Section 4.6.4)
- Fatigue of Primary Containment Penetrations (Section 4.6.5)

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.

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-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	Consistent with NUREG-1801 with exceptions (see Appendices B2.1.23 and B2.1.26). The recommendations in NUREG-1611 identify stress corrosion cracking of bellows as an aging effect requiring management by examination categories E-B and E-F of the ASME Section XI Inservice Inspection (Subsection IWE) Program (LRA Section B2.1.23) and by the 10 CFR 50 Appendix J Program (LRA Section B2.1.26). In addition, per NUREG-1611, an augmented VT-1 visual examination will be performed using enhanced techniques qualified for detecting SCC.
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.

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-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. The ASME Section XI Inservice Inspection Program (Subsection IWE) Program is credited with managing aging of moisture barriers (see Appendix B2.1.23). NMP1 has one moisture barrier in its Containment design. For resilient seals in airlocks and hatches, NMP1 does not credit the Containment ISI (ASME Section XI, Subsection IWE Program) because the NMP1 IWE program references the 1998 edition of ASME Section XI, which does not include gaskets and seals within the scope of components requiring examination. NMP1 credits the Type B tests performed under the 10 CFR 50 Appendix J Program (Appendix B2.1.26) for managing loss of sealing and leakage through containment caused by degradation of resilient seals in airlocks and hatches.

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.
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.
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.

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-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.
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	Consistent with NUREG-1801 with exceptions (see Appendices B2.1.23 and B2.1.26). The recommendations in NUREG-1611 identify stress corrosion cracking of bellows as an aging effect requiring management by examination categories E-B and E-F of the ASME Section XI Inservice Inspection (Subsection IWE) Program (LRA Section B2.1.23) and by the 10 CFR 50 Appendix J Program (LRA Section B2.1.26). In addition, per NUREG-1611, an augmented VT-1 visual examination will be performed using enhanced techniques qualified for detecting SCC.
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.
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.

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-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	Consistent with NUREG-1801. In addition to the fuel pool liner, this line item also applies to the following NMP1 components: • Fasteners (wrought austenitic stainless steel) in treated water • Spent Fuel Racks • Structural Steel (wrought austenitic stainless steel) in treated water.
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.
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.

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-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	Consistent with NUREG-1801.

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	Consistent with NUREG-1801 with exceptions (see Appendices B2.1.23 and B2.1.26). The recommendations in NUREG-1611 identify stress corrosion cracking of bellows as an aging effect requiring management by examination categories E-B and E-F of the ASME Section XI Inservice Inspection (Subsection IWE) Program (LRA Section B2.1.23) and by the 10 CFR 50 Appendix J Program (LRA Section B2.1.26). In addition, per NUREG-1611, an augmented VT-1 visual examination will be performed using enhanced techniques qualified for detecting SCC.
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).

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-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 The ASME Section XI Inservice Inspection Program (Subsection IWE) Program manages the aging of moisture barriers (see Appendix B2.1.23); however, NMP 2 has no moisture barriers in its Containment design. For resilient seals in airlocks and hatches, NMP2 does not credit the Containment ISI (ASME Section XI, Subsection IWE Program) because the NMP2 IWE program references the 1998 edition of ASME Section XI, which does not include gaskets and seals within the scope of components requiring examination. NMP2 credits the Type B tests performed under the 10 CFR 50 Appendix J Program (Appendix B2.1.26) for managing loss of sealing and leakage through containment caused by degradation of resilient seals in airlocks and hatches.

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.
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.

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-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.
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).
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	Consistent with NUREG-1801 with exceptions (see Appendices B2.1.23 and B2.1.26). The recommendations in NUREG-1611 identify stress corrosion cracking of bellows as an aging effect requiring management by examination categories E-B and E-F of the ASME Section XI Inservice Inspection (Subsection IWE) Program (LRA Section B2.1.23) and by the 10 CFR 50 Appendix J Program (LRA Section B2.1.26). In addition, per NUREG-1611, an augmented VT-1 visual examination will be performed using enhanced techniques qualified for detecting 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-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.
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	Consistent with NUREG-1801 In addition to the fuel pool liner, this line item also applies to following NMP2 components: • Fasteners (wrought sutenitic stainless steel) in treated water • Fuel Preparation Machines • Storage Racks and Frames • Structural Steel (wrought austenitic stainless steel) in treated water.
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.

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-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.
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.

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-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				
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	Consistent with NUREG-1801.

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	RD SPB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
Aluminum Alloy in Air	SP	Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
Concrete in Air	DF RD SPB SP SFS NSS	Concrete	Air	None	Structures Monitoring Program			H, 6
Copper Alloy (Zinc < 15%) in Air	SFS	Copper Alloys (Zinc < 15%)	Air	None	None			None
Drywell Coating	NSS	Coating	Air	Cracking Delamination	Protective Coating Monitoring and 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 3.5.2.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
Equipment Hatches (including stabilizers)	RD SPB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
			Air, relative motion between components	Loss of Leak Tightness	10 CFR 50 Appendix J Program	II.B4.2-b	3.5.1.B-05	A, 3
Expansion Joints (Mechanical)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
Expansion/ Grouted Anchors (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
			Concrete	Loss of Anchor Capacity	Structures Monitoring Program	III.B1.1.4-a III.B1.2.3-a	3.5.1.A-29	A
Fasteners (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

See Table 2.0-1 for 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
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
Fasteners (Wrought Austenitic Stainless Steel) in Air	SPB SFS	Wrought Austenitic Stainless Steel	Air	None	None			None
Moisture Barrier	SPB SP	Polymer	Air	Loss of Sealing	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.3-a	3.5.1.A-06	B
Nickel Based Alloys in Air	PB SFS SPB	Nickel Based Alloy	Air, Cyclic Loading	Cracking	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.1-d	3.5.1.A-02	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 3.5.2.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)	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			J, 5
Seals and Gaskets	SPB SP	Polymers	Air	Loss of Sealing	10 CFR 50 Appendix J Program	II.B4.3-a	3.5.1.A-06	E
Structural Steel (Carbon and Low Alloy Steel) in Air	DF HELB MB PB RD SP SPB SFS NSS	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
					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

See Table 2.0-1 for 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	PB SPB SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	DF PB SPB SFS SP	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			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-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)	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			J, 5
		Aluminum, 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	DF	Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
Aluminum Alloys in Treated Water	DF	Aluminum, 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 SPB	Masonry Walls	Air	Cracking	Masonry Wall Program	III.A2.3-a	3.5.1.A-24	A
Concrete in Air	DF FB RD SP SPB NSS SFS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	SP NSS SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	DF SP NSS 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.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 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)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.A-20	D, 1
	FB SPB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.A-20	D, 1
Doors (cont'd)	SPB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.A-20	A
	SPB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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)	Air	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.A-20	A
			Concrete	Loss of Anchor Capacity	Structures Monitoring Program	III.B1.2.3-a	3.5.1.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 3.5.2.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 (Carbon and Low Alloy Steel) in Air	SFS NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Structures Monitoring Program	III.A2.2-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.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
Fasteners (Wrought Austenitic Stainless Steel) in Treated Water	SFS	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Cracking	Water Chemistry Control Program	III.A5.2-b	3.5.1.A-23	D
Liners	SPB	Wrought Austenitic Stainless Steel	Air	None	None			None
			Treated Water, temperature < 140°F, Low Flow	Cracking	Water Chemistry Control Program	III.A5.2-b	3.5.1.A-23	D
Metal Siding in Air	PR SPB	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
Seals and Gaskets	DF ES SPB NSS	Polymers	Air	Loss of Sealing	Structures Monitoring Program			J
	SPB	Polymers	Treated Water, temperature < 140°F, Low Flow	Loss of Sealing	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)	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	DF FB FP SPB SP SFS NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.A-20	A
Torus Support Columns	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 NSS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	SFS NSS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	SFS NSS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Fasteners (Carbon and Low Alloy Steel) in Air	NSS	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
Polymer in Air, Relative Motion (Bearing Plate)	NSS	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
Structural Steel (Carbon and Low Alloy Steel) in Air	SP NSS	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
Treated Wood in Air	SP	Wood	Air	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.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
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
Fasteners (Wrought Austenitic Stainless Steel) in Treated Water	SFS	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
Refueling Platform	NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
Spent Fuel Racks	SFS	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Cracking	Water Chemistry Control Program	III.A5.2-b	3.5.1.A-23	D
Structural Steel (Wrought Austenitic Stainless Steel) in Air	NSS	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-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
Structural Steel (Wrought Austenitic Stainless Steel) in Treated Water	NSS	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Cracking	Water Chemistry Control Program	III.A5.2-b	3.5.1.A-23	D

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 NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
Handling Crane	NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 NSS	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	NSS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	NSS	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
			Concrete	Loss of Anchor Capacity	Structures Monitoring Program	III.B1.2.3-a	3.5.1.A-29	A
Fasteners (Carbon and Low Alloy Steel) in Air	SFS NSS	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-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 (Wrought Austenitic Stainless Steel) in Air	NSS	Wrought Austenitic Stainless Steel	Air	None	None			None
Structural Steel (Carbon and Low Alloy Steel) in Air	SFS NSS	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
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	DF FB FP NSSSD	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	DF FP NSS SD	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	FP NSS SD	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.A-20	C, 1
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	NSS	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
Seals and Gaskets	NSS	Polymers	Air	Loss of Sealing	Structures Monitoring Program			J
Structural Steel (Carbon and Low Alloy Steel) in Air	SPB NSS RD	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
Structural Steel (Wrought Austenitic Stainless Steel) in Air	NSS	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-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 NSS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Raw Water	SP SFS NSS SDC	Concrete	Raw Water	None	Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	SP SFS NSS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	SP SFS NSS SDC	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 NSS	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
			Concrete	Loss of Anchor Capacity	Structures Monitoring Program	III.B1.2.3-a	3.5.1.A-29	A
Fasteners (Carbon and Low Alloy Steel) in Air	SFS NSS	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-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 Raw Water	NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 NSS	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
Structural Steel (Carbon and Low Alloy Steel) in Raw Water	NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 Soil Above the GWT	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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)	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 RD SFS	Masonry Walls	Air	Cracking	Masonry Wall Program	III.A3.3-a	3.5.1.A-24	A
Concrete in Air	DF FB RD SP SPB SFS NSS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	RD SP SPB SFS NSS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	DF RD SP SPB SFS NSS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A
	FP FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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)	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.2-d	3.3.1.A-20	A
	FB NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.2-d	3.3.1.A-20	A
	SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A
	NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 NSS	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
			Concrete	Loss of Anchor Capacity	Structures Monitoring Program	III.B1.2.3-a	3.5.1.A-29	A
Fasteners (Carbon and Low Alloy Steel) in Air	SFS NSS	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
Gray Cast Iron in Air	SP	Gray Cast Iron	Air	Loss of Material	Structures Monitoring Program			J
Seals and Gaskets	ES SPB	Polymers	Air	Loss of Sealing	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-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	DF MB PR SP SPB SFS NSS	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

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
Seals and Gaskets	ES	Polymers	Soil, below the water table	Loss of Sealing	Structures Monitoring Program			J
Structural Steel (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.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-24	A
Concrete in Air	DF FB FP SP SFS NSS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	FP SP SFS NSS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	FP SP SFS NSS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	NSS	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
			Concrete	Loss of Anchor Capacity	Structures Monitoring Program	III.B1.2.3-a	3.5.1.A-19	A
Fasteners (Carbon and Low Alloy Steel) in Air	NSS	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-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
Fasteners (Wrought Austenitic Stainless Steel) in Air	NSS	Wrought Austenitic Stainless Steel	Air	None	None			None
Seals and Gaskets	FP ES	Polymers	Air	Loss of Sealing	Structures Monitoring Program			J
Structural Steel (Carbon and Low Alloy Steel) in Air	DF FB FP SP NSS	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
Structural Steel (Wrought Austenitic Stainless Steel) in Air	NSS	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	RD SP SPB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
				Loss of Leak Tightness	10 CFR 50 Appendix J Program	II.B4.2-b	3.5.1.B-05	A, 3
Aluminum Alloy in Air	PWR	Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
Biological Shield Wall Doors	HELB RD	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
Copper Alloy (Zinc ≥ 15%) in Air	SFS	Copper Alloys (Zinc ≥ 15%) and Aluminum Bronze	Air	None	None			None
Concrete in Air	HELB MB SPB RD 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 Coating	NSS	Coating	Air	Cracking Delamination	Protective Coating Monitoring and Maintenance Program			J
Drywell Head (including stainless steel elements)	MB PB SP SPB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	PB SFS SPB	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
Drywell Head Fasteners	NSS	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			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-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	MB PB RD SP SPB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
			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
				Loss of Leak Tightness	10 CFR 50 Appendix J Program	II.B4.2-b	3.5.1.B-05	A, 3
		Wrought Austenitic Stainless Steel	Air	None	None			None
Impingement and Jet Shielding	DF HELB	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
Inner Refueling Seal	NSS	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
Seals and Gaskets	DF SPB	Polymers	Air	Loss of Sealing	10 CFR 50 Appendix J Program	II.B4.3-a	3.5.1.B-06	E
Refueling Bulkhead	SPB 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)	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	DF HELB MB NSS PWR PB RD SPB SP SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	10 CFR 50 Appendix J Program	II.B2.2.2-a	3.5.1.B-12	B
					ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.1-a	3.5.1.B-03	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	PB SP SFS SPB	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	PB SP SFS SPB	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 PWR PB SP SPB SFS	Wrought Austenitic Stainless Steel	Air	None	None			None
Structural Steel (Wrought Austenitic Stainless Steel) in Demineralized Untreated Water	DF PB SP SPB 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	PR	Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
Concrete in Air	DF FB FP HELB MB SPB RD SP SFS NSS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	FP HELB MB RD SPB SP SFS NSS	Concrete	Soil, above 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
Concrete in Soil Below the GWT	DF FP HELB RD SPB SP SFS NSS	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)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	D, 1
	FB FP SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	D, 1
	FB SPB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	D, 1
	FB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	D, 1
	FP SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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)	SPB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A
	RD SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A
	RD NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A
	SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A
	NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 NSS	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
			Concrete	Loss of Anchor Capacity	Structures Monitoring Program	III.B1.2.3-a	3.5.1.B-29	A
Fasteners (Carbon and Low Alloy Steel) in Air	SFS NSS	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 (High Strength Carbon and Low Alloy Steel) in Air	PWR	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
Fasteners (Precipitation Hardenable) in Air	PWR SFS	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
Fasteners (Wrought Austenitic Stainless Steel) in Air	FP SFS SPB	Wrought Austenitic Stainless Steel	Air	None	None			None
Fasteners (Wrought Austenitic Stainless Steel) in Soil Below the GWT	FP SPB	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	Cracking	Water Chemistry Control Program	III.A5.2-b	3.5.1.B-23	D
Fuel Pool Gates	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.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
Fuel Transfer Shielding Bridge (Refueling Area)	NSS	Wrought Austenitic Stainless Steel	Air	None	None			None
Liners	SPB	Wrought Austenitic Stainless Steel	Air	None	None			None
			Treated Water, temperature < 140°F, Low Flow	Cracking	Water Chemistry Control Program	III.A5.2-b	3.5.1.B-23	D
Mechanical Penetrations (thimbles)	FP SFS SPB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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)	Air	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A
Plug Liners	SPB	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	C, 7
Seals and Gaskets	DF ES FP SPB	Polymers	Air	Loss of Sealing	Structures Monitoring Program			J
Seals and Gaskets	ES FP SPB	Polymers	Soil, below the water table	Loss of Sealing	Structures Monitoring Program			J
Porous Concrete 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
Structural Steel (Carbon and Low Alloy Steel) in Air	DF PWR RD SPB SP SFS NSS	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
Structural Steel (Wrought Austenitic Stainless Steel) in Air	SP SFS PR NSS	Wrought Austenitic Stainless Steel	Air	None	None			None
Overpressurization Vent Panels	SFS PR	Aluminum, 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	DF FB FP MB SP SFS NSS	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)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	B
Fasteners (Carbon and Low Alloy Steel) in Air	SP SFS NSS	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
Seals and Gaskets	ES FP	Polymers	Air	Loss of Sealing	Structures Monitoring Program			J
	FP	Polymers	Soil, below the water table	Loss of Sealing	Structures Monitoring Program			J
Structural Steel (Carbon and Low Alloy Steel) in Air	SP SFS NSS	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

See Table 2.0-1 for 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	DF FB FP MB SPB RD SP SFS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	FP MB SPB RD SP SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	DF FP SPB RD 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)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	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 3.5.2.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)	FP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A1.2-a	3.5.1.B-20	A
	FB FP SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	D, 1
	FB SPB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	D, 1
	FB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	D, 1
	MB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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)	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A1.2-a	3.5.1.B-20	A
	NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A1.2-a	3.5.1.B-20	A
Expansion/ Grouted	SFS	Carbon or Low Alloy Steel	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-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
Anchors (Carbon and Low Alloy Steel) in Air		(Yield Strength < 100 Ksi)	Concrete	Loss of Anchor Capacity	Structures Monitoring Program	III.B1.2.3-a	3.5.1.B-29	A
Fasteners (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.A1.2-a	3.5.1.B-20	A
Fasteners (Wrought Austenitic Stainless Steel) in Air	FP SPB	Wrought Austenitic Stainless Steel	Air	None	None			None
Fasteners (Wrought Austenitic Stainless Steel) in Soil Below the GWT	FP SPB	Wrought Austenitic Stainless Steel	Soil, below the water table	Loss of Material	Structures Monitoring Program			J
Seals and Gaskets	ES FP SPB	Polymers	Air	Loss of Sealing	Structures Monitoring Program			J
			Soil, below the water table	Loss of Sealing	Structures Monitoring Program			J
Structural Steel (Carbon and Low Alloy Steel) in Air	FP SPB SP SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	DF FB FP MB SP SFS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	DF 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)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.4-d	3.3.1.B-20	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-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)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.4-d	3.3.1.B-20	B
	SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
	NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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)	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
			Concrete	Loss of Anchor Capacity	Structures Monitoring Program	III.B1.2.3-a	3.5.1.B-29	A
Fasteners (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
Fasteners (Wrought Austenitic Stainless Steel) in Air	FP	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-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 (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
Gray Cast Iron in Air	SP	Gray Cast Iron	Air	Loss of Material	Structures Monitoring Program			J
Seals and Gaskets	ES FP	Polymers	Air	Loss of Sealing	Structures Monitoring Program			J
	FP	Polymers	Soil, below the water table	Loss of Sealing	Structures Monitoring Program			J
Structural Steel (Carbon and Low Alloy Steel) in Air	FP MB SP SFS NSS	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

See Table 2.0-1 for 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	NSS	Aluminum, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
Concrete in Air	DF FB FP GDP MB NSS SP SFS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	FP GDP MB NSS SP SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	DF FP GDP NSS SP SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Below GWT	NSS 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)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	D, 1
	FB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	D, 1
	SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
	NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
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 NSS	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
			Concrete	Loss of Anchor Capacity	Structures Monitoring Program	III.B1.2.3-a	3.5.1.B-29	A
Fasteners (Carbon and Low Alloy Steel) in Air	SFS NSS	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

See Table 2.0-1 for 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
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
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 SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Soil, below the water table	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Seals and Gaskets	ES FP SPB	Polymers	Air	Loss of Sealing	Structures Monitoring Program			J
	FP	Polymers	Soil, below the water table	Loss of Sealing	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
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
Structural Steel (Carbon and Low Alloy Steel) in Air	SP MB NSS 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
Treated Wood in Air	NSS	Wood	Air	Loss of Material	Wooden Power Pole Inspection Program			J
				Loss of Material Properties	Wooden Power Pole Inspection Program			J
Treated Wood in Soil Above the GWT	NSS	Wood	Soil, above the water table	Loss of Material	Wooden Power Pole Inspection Program			J
				Loss of Material Properties	Wooden Power Pole Inspection Program			J
Treated Wood in Soil Below the GWT	NSS	Wood	Soil, below the water table	Loss of Material	Wooden Power Pole Inspection Program			J
				Loss of Material Properties	Wooden Power Pole 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 3.5.2.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
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
Channel Handling Boom	NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Structures Monitoring Program			J
Carousel	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Structures Monitoring Program			J
Fuel Preparation Machines	SFS	Wrought Austenitic Stainless Steel	Air	None	None			None
			Treated Water, temperature < 140°F, Low Flow	Cracking	Water Chemistry Control Program	III.A5.2-b	3.5.1.B-23	D
Lifting Beams	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Structures Monitoring Program			J
New Fuel Storage Rack	SFS	Wrought Austenitic Stainless Steel	Air	None	None			None
New Fuel Storage Vault Cover	NSS	Aluminum, 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-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
Recirculation Pump Motor Lifting Lugs	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Structures Monitoring Program			J
Refueling Crane and Platform Equipment	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	Cracking	Water Chemistry Control Program	III.A5.2-b	3.5.1.B-23	D

See Table 2.0-1 for 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	DF GDP SP SFS NSS	Concrete	Air	None	Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	GDP SP SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	GDP SP 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	NSS	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	C, 2
			Concrete	Loss of Anchor Capacity	Structures Monitoring Program	III.B1.2.3-a	3.5.1.B-29	A
Fasteners (Carbon and Low Alloy Steel) in Air	NSS	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	C, 2
Fasteners (Wrought Austenitic Stainless Steel) in Air	FP	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-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
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
Seals and Gaskets	ES FP GDP	Polymers	Air	Loss of Sealing	Structures Monitoring Program			J
	FP	Polymers	Soil, below the water table	Loss of Sealing	Structures Monitoring Program			J
Structural Steel (Carbon and Low Alloy Steel) in Air	FP GDP SFS NSS	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	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	NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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	NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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)	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	DF FB FP RD NSS SFS SP	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	FP NSS RD SFS SP	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	DF FP NSS RD SFS SP	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Below the GWT	NSS SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	D, 1
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	NSS	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
			Concrete	Loss of Anchor Capacity	Structures Monitoring Program	III.B1.2.3-a	3.5.1.B-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 3.5.2.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	NSS	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	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
Seals and Gaskets	ES FP	Polymers	Air	Loss of Sealing	Structures Monitoring Program			J
			Soil, below the water table	Loss of Sealing	Structures Monitoring Program			J
Structural Steel (Carbon and Low Alloy Steel) in Air	FP NSS SFS SPB	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 (Wrought Austenitic Stainless Steel) in Air	NSS	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-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	DF FB FP MB SP SFS NSS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Raw Water	FP MB SP SFS NSS SCW	Concrete	Raw Water	None	Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	FP SP SFS SCW	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	DF FP SP SFS SCW	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 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)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.1-d	3.3.1.B-20	B
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	SFS NSS	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
				Loss of Anchor Capacity	Structures Monitoring Program	III.B1.2.3-a	3.5.1.A-29	A
Expansion/ Grouted Anchors (Wrought Austenitic Stainless Steel) in Raw Water	SFS	Wrought Austenitic Stainless Steel	Raw Water	Loss of Material	Structures Monitoring Program			J
			Concrete	Loss of Anchor Capacity	Structures Monitoring Program	III.B1.2.3-a	3.5.1.A-29	A
Fasteners (Carbon and Low Alloy Steel) in Air	SFS NSS	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 (Carbon and Low Alloy Steel) in Raw Water	SFS NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Fasteners (Wrought Austenitic Stainless Steel) in Air	FP 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.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
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
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
Seals and Gaskets	ES DF FP	Polymers	Air	Loss of Sealing	Structures Monitoring Program			J
	ES DF	Polymers	Raw Water	Loss of Sealing	Structures Monitoring Program			J
	FP	Polymers	Soil, below the water table	Loss of Sealing	Structures Monitoring Program			J
Structural Steel (Carbon and Low Alloy Steel) in Air	FP MB DF SP SFS NSS	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 Raw Water	DF FLT SP SCW NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Raw Water	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
Structural Steel (Wrought Austenitic Stainless Steel) in Air	DF	Wrought Austenitic Stainless Steel	Air	None	None			None
Structural Steel (Wrought Austenitic Stainless Steel) in Raw Water	DF SP SFS SCW	Wrought Austenitic Stainless Steel	Raw Water	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)	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 NSS SP SFS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	FP HELB MB NSS SP SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	FP NSS SP SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Above the GWT	NSS SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Below the GWT	NSS SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	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 3.5.2.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)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	D, 1
	FB SPB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	D, 1
	FP NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
	MB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
	MB SPB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
	NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 NSS	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

See Table 2.0-1 for 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
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
Seals and Gaskets	ES SPB	Polymers	Air	Loss of Sealing	Structures Monitoring Program			J
Structural Steel (Carbon and Low Alloy Steel) in Air	SFS NSS	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

See Table 2.0-1 for 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 RD	Masonry Walls	Air	Cracking	Masonry Wall Program	III.A3.3-a	3.5.1.B-24	A
Concrete in Air	DF FB FP HELB RD SP SFS NSS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	SP SFS NSS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	DF FP SP SFS NSS	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)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.2-d	3.3.1.B-20	B
	FB FP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.2-d	3.3.1.B-20	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-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 RD	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.2-d	3.3.1.B-20	B
	FP SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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 NSS	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
			Concrete	Loss of Anchor Capacity	Structures Monitoring Program	III,B1.2.3-a	3.5.1.B-29	A
Fasteners (Carbon and Low Alloy Steel) in Air	SFS NSS	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 (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	FP PWR 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.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 (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
Seals and Gaskets	ES FP	Polymers	Air	Loss of Sealing	Structures Monitoring Program			J
	FP	Polymers	Soil, below the water table	Loss of Sealing	Structures Monitoring Program			J
Structural Steel (Carbon and Low Alloy Steel) in Air	FP PWR SP SFS NSS	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

See Table 2.0-1 for 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 NSS	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 NSS	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 NSS	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.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
			Concrete	Loss of Anchor Capacity	ASME Section XI Inservice Inspection (Subsection IWF) Program			H
					Structures Monitoring Program	III.B1.2.3-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 (Wrought Austenitic Stainless Steel) in Air (NMP2 only)	SFS	Wrought Austenitic Stainless Steel	Concrete	Loss of Anchor Capacity	ASME Section XI Inservice Inspection (Subsection IWF) Program			H
					Structures Monitoring Program	III.B1.2.3-a	3.5.1.A-29 3.5.1.B-29	A
Fasteners (Carbon and Low Alloy Steel) in Air	SFS NSS	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.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
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	SFS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Cracking	Bolting Integrity Program	III.B1.1.2-a	3.5.1.A-33 3.5.1.B-33	A
	SFS NSS	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

[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 (Precipitation Hardenable) in Air (NMP1 only)	SFS NSS	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
Grout in Air	SFS NSS	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
Polymeric Supports in Air with Vibratory Motion	SFS NSS	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	MB SFS NSS	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.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
Structural Steel (Carbon and Low Alloy Steel) in Soil Above the GWT (NMP2 only)	SFS NSS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	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
Structural Steel (Precipitation Hardenable) in Air (NMP2 only)	SFS NSS	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
Structural Steel (Wrought Austenitic Stainless Steel) in Air	SFS NSS	Wrought Austenitic Stainless Steel	Air	None	None			None
Structural Steel (Wrought Austenitic Stainless Steel) in Air, Vibratory Motion (NMP2 only)	SFS NSS	Wrought Austenitic Stainless Steel	Air, vibratory 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 NSS	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	Cracking	Water Chemistry Control Program	III.A5.2-b	3.5.1.A-23 3.5.1.B-23	D

[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	Aluminum, 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
Structural Steel (Carbon and Low Alloy Steel) in Air (NMP2 only)	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Air	Loss of Material	Fire Protection Program			J

[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.

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 Alloy (Clamp)

- Insulator Materials

- Various Metals

- 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 heat, radiation, or moisture in the presence of oxygen
- 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
- Loosening of Bolted Connections

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 Cable Metallic Connections Inspection Program
- Non-EQ Electrical Cables Used in Instrumentation Circuits Program
- Fuse Holder Inspection Program

3.6.2.1.2 Non-Segregated/Switchyard Bus

Materials

The materials of construction for the Non-Segregated/Switchyard Bus are:

- Aluminum

- Cement
- Metal
- Porcelain
- Steel
- Various Organic Polymers

Environment

The Non-Segregated/Switchyard Bus is exposed to the following environment:

- Air

Aging Effects Requiring Management

The following aging effects, associated with the Non-Segregated/Switchyard Bus, require management:

- Loosening of Bolted Connections
- Loss of Insulation Resistance

Aging Management Programs

The following aging management programs manage the aging effects for the Non-Segregated/Switchyard Bus:

- Non-Segregated Bus Inspection Program
- Preventive Maintenance Program

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:

- Adverse localized environment caused by heat or radiation
- Air

Aging Effects Requiring Management

The following aging effects, associated with the Containment Electrical Penetrations, require management:

- Loss of Insulation Resistance
- Loss of Leak Tightness

Aging Management Programs

The following aging management programs manage the aging effects for the Containment Electrical Penetrations:

- ASME Section XI Inservice Inspection (Subsection IWE) Program
- Non-EQ Cables and Connections Program
- 10 CFR 50 Appendix J Program

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

- Steel

Environment

The Switchyard Components are exposed to the following environment:

- Air

Aging Effect Requiring Management

The following aging effect, associated with the Containment Electrical Penetrations, requires management:

- Loosening of Bolted Connections

Aging Management Program

The following aging management program manages the aging effects for the Containment Electrical Penetrations:

- Preventive Maintenance Program

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. This program also is utilized to manage the degradation of Fuse Holder insulator materials.

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	NMP1 has no inaccessible medium voltage cables that are within scope of license renewal. NMP2 has no inaccessible medium voltage cables within scope of license renewal that meet the the NUREG-1801 program criteria for requiring aging management.
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
Conductor insulation for electrical cables and connectors	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
			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
Conductor insulation for electrical cables used in circuits that are sensitive to reduction in conductor insulation resistance (IR)	EC	Various Organic Polymers	Adverse localized environment caused by heat	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, 2, 6
			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
Conductor Connectors	EC	Various Metals	Air	Loosening of Bolted Connections	Non-EQ Electrical Cable Metallic Connections Inpsection 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 3.6.2.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
Fuse Holders (not part of a larger assembly)	EC	Insulator Materials	Adverse localized environment caused by heat, radiation, or moisture in the presence of oxygen	Loss of Electrical Continuity	Non-EQ Electrical Cables and Connections Program	VI.A.1-a	3.6.1-02	C, 4
			Air	None	None			None
		Copper Alloy (clamp)	Air	Loss of Electrical Continuity	Fuse Holder Inspection Program			J, 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 3.6.2.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
Non-Segregated Bus Insulators	EI	Cement	Air	None	None			None
		Porcelain	Air	Loss of Insulation Resistance	Non-Segregated Bus Inspection Program			J, 1
		Metal	Air	None	None			None
Non-Segregated Bus	EC	Aluminum	Air	None	Non-Segregated Bus Inspection Program			J, 5
Non-Segregated Bus Connectors	EC	Aluminum, Steel	Air	Loosening of Bolted Connections	Non-Segregated Bus Inspection Program			J
Non-Segregated Bus Insulation	EI	Various Organic Polymers	Air	Loss of Insulation Resistance	Non-Segregated Bus Inspection Program			J, 1
Switchyard Bus Conductors	EC	Aluminum	Air	None	None			None
Switchyard Bus Connectors	EC	Aluminum, Steel	Air	Loosening of Bolted Connections	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 3.6.2.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	PB	Various Organic Polymers	Air	Loss of Leak Tightness	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.3-a	3.5.1.A-06	A, 6
	EC	Various Organic Polymers	Adverse localized environment caused by heat or radiation	Loss of Insulation Resistance	Non-EQ Cables and Connections Program	VI.A.1-a VI.A.1-b	3.6.1-02 3.6.1-03	C, 1, 2, 3, 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	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
Transmission Conductor Connections	EC	Aluminum, Steel	Air	Loosening of Bolted Connections	Preventive Maintenance Program			J

Notes for Tables 3.6.2.C-1 through 3.6.2.C-4:

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.

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. Loss of electrical continuity for this component can occur from embrittlement, cracking, melting, discoloration, swelling, or loss of dielectric strength leading to reduced insulation resistance as a result of degradation (thermal/thermoxidative) of organics, radiation-induced oxidation, moisture intrusion, or ohmic heating.

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.

7. Loss of electrical continuity for this component can occur as a result of fatigue, ohmic heating, thermal cycling, electrical transients, frequent manipulation, chemical contamination, corrosion, and oxidation.

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**	Not Applicable	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)(iii)	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
	Fatigue of Primary Containment Penetrations	§54.21(c)(1)(ii) and §54.21(c)(1)(iii)	4.6.5
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)(iii)	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, "Acceptance Criteria for Fracture Prevention Measures for Light Water Nuclear Power Reactors for Normal Operation," and §50.61, "Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events," 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 service levels (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 4.2-1a and Table 4.2-2a 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)	$5.21x10^{18}$	$3.39x10^{18}$	0.236	53.3 (NOTE 4)	40	Acceptable (NOTE 5)
Plate G-307-4 (NOTE 3)	$5.21x10^{18}$	$3.39x10^{18}$	0.27	52 (NOTE 4)	37.2	Acceptable (NOTE 5)
Weld 1248 (NOTE 6)	$5.21x10^{18}$	$3.39x10^{18}$	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)

Parameter	Value	Reference
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)

Parameter	Value	Reference
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/cm²)		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/cm², 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/cm²-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 5×10^{-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) indicate 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(FIE) 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 5×10^{-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. Due to physical constraints, the percentage of effective weld coverage for the NMP1 RPV does not meet the criteria for "essentially 100%", defined in §50.55a, "Codes and Standards," as greater than 90% of the examination volume of each weld. 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
NMP1	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 July 2005	Percentage of Design Cycles
Vessel Head Removal	50	20	40.0%
Vessel Head Reinstallation	50	20	40.0%
100°F/hr Heatup	240 (NOTE 1)	144	60.0%
100°F/hr Cooldown	229 (NOTE 1)	142	62.0%
300°F/hr Emergency Cooldown	10	1	10.0%
Blowdown	1	0	0.0 %
Scram Cycles	280 (NOTE 1)	150	53.6%
Emergency Condenser Initiation Into Isolated Loop	30 (NOTE 2)	(NOTE 4)	
Unisolation of an Isolated Loop	30 (NOTE 3)	(NOTE 4)	
Emergency Condenser Initiation Into Idle Loop	30 (NOTE 2)	(NOTE 4)	
Shutdown Cooling Initiation Into Isolated Loop	240 (NOTE 3)	(NOTE 4)	
Inadvertent Start of Cold Loop	20 (NOTE 3)	(NOTE 4)	
Emergency Condenser Into Pumped Loop	500 (NOTE 3)	(NOTE 4)	
Recirculation Pump Hot Loop Startup	300 (NOTE 3)	(NOTE 4)	

(NOTE 1) Value is from Table V-2 in Reference 4.8-33.

(NOTE 2) The number of design cycles used in the fatigue analysis is a conservative estimate based on a review of operating history.

(NOTE 3) The contribution to recirculation nozzle CUF from these five recirculation loop transients was determined to be insignificant in comparison to the Emergency Condenser initiation transients. The number of design cycles used in the fatigue analysis is a conservative estimate based on engineering judgement.

(NOTE 4) 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. However, the actual number of cycles, based on either engineering judgement or a review of operating history, estimated to be well within the assumptions used in the fatigue analysis.

Table 4.3-2
Transient Monitoring Data for NMP2

Event	Design Cycles Analyzed	Actual Transients	
		Cycles to July 2005	Percentage of Design Cycles
Vessel Boltup	123	12	9.8%
Vessel Unbolt	123	11	8.9%
Vessel Hydrotest	130	21	16.2%
Reactor Startup	120	102	85.0%
Reactor Shutdown	111	101	91.0%
Control Rod Sequence Exchange	400	31	7.8%
Power Change ≥ 25%	2000	164 (NOTE 1)	8.2 %
Loss of Feedwater Heating (partial heater bypass)	80	4	5.0%
SCRAM/Generator Trip without Loss Of Feedwater	40 (NOTE 2)	84	46.7%
Other SCRAMs	140 (NOTE 2)		
SCRAM with Loss of Feedwater	10 (NOTE 2)	10 (NOTE 3)	100%
SCRAM with Safety or Relief Valve Actuation	8	2	25 %
SRV Discharge	5,200	182	3.5 %
LPCI or LPCS Injection	10	5	50.0 %
HPCS Injection (SCRAM with Loss of Feedwater)	30	10 (NOTE 4)	25 %
HPCS Injection without Loss of Feedwater	10		
RCIC Injection (SCRAM with Loss of Feedwater)	30	44 (NOTE 5)	62.9%
RCIC Injection without Loss Of Feedwater	40		

(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) An interim evaluation has been completed providing justification for exceeding the allowable number of cycles for this event. The evaluation justifies up to 9 additional cycles. This evaluation will be superseded by the determination of actual CUFs for limiting components when FatiguePro implementation is completed.

(NOTE 4) 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 5) 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).

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.

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 zone[1] 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] The break exclusion zone consists of those portions of high-energy fluid system piping between the moment limiting restraint(s) outside the outboard containment isolation valve and the moment limiting restraint(s) beyond the inboard containment isolation valve. The choice of the restraint(s) that define the limits of the break exclusion zone is based upon those restraint(s) which are necessary to ensure the operability of the primary containment isolation valves.

(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, the tie rods installed as repair for the NMP1 core shroud horizontal welds, and certain locations in the NMP2 reactor vessel internals were evaluated for fatigue. Similarly, NMP2 reactor vessel internals were not strictly designed to meet subsection NG of ASME Section III; however, fatigue usage values for the reactor vessel internals were determined consistent with subsection NG of Section III of the ASME Code 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).

NINE MILE POINT NUCLEAR STATION

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). The maximum fatigue usage for any part of the tie rods or their attachment points was 0.0081 for 25 years. 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 safety relief valve (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 generic analysis in MPR-751 assumed the following transients:

- Periodic SRV actuations over the life of the plant with the total number of actuations determined for the specific plant. One combined thermal and anchor motion load is assumed to act during each initiation (for NMP1, the attachment to Reference 4.8-61 indicates up to 4500 stress cycles can be expected due to SRV discharge. Plant-specific information for NMP1 indicates that 500 SRV discharge cycles were assumed to occur during normal operation.

- Five operating basis earthquakes.

- One accident condition consisting either of a design basis accident (DBA) or intermediate break accident/small break accident (IBA/SBA) which includes: (i) one combined thermal and anchor motion loading, (ii) operating basis earthquake (OBE) and safe shutdown earthquake (SSE) stresses, and (iii) periodic SRV actuations during IBA/SBA with the total number of actuations determined for the specific plant.

Two NMP1 specific locations were analyzed in MPR-751, consisting of one small-bore location and one large-bore location. The highest usage factor for the two NMP1 locations analyzed was for the large bore location, the 12-inch core spray suction line for Core Spray Pump 111, which enters the torus at penetration XS-337. This location has a cumulative usage factor (CUF) of 0.036 for 40 years based on the normal operating condition (NOC) plus intermediate break accident /small break accident condition (NOC+IBA/SBA) case. For the case of NOC+DBA, this location had a cumulative usage factor of 0.001 for 40 years. The small bore location is the 3-inch containment spray line that enters the torus at penetration XS-326; with calculated 40-year CUFs of 0.012 for the NOC+DBA case and 0.000 for NOC+IBA/SBA case.

Since NMP1 has not experienced a DBA, an IBA/SBA, or an OBE/SBE, the primary contributor to actual fatigue usage is SRV discharge during normal operation. NMP1 has historically not counted SRV actuations, so the actual number of such transients experienced is not available.

However, the estimated number of SRV actuations to date for NMP1 is 370. This estimate is based on information from NRC correspondence related to relief valve operation, NMP1 operating reports (annual and monthly), and NMP1 Licensee Event Reports (LERs) since the NRC requirement to report scrams went into effect.

LERs for scrams were only required after 10 CFR 50.73 went into effect on January 1, 1984. Prior to this, scrams and SRV lifts were not routinely reported to the NRC. However, NMP correspondence to the NRC, dated January 18, 1974, in response to a question about the dynamic effects of relief valve blowdown, including both automatic and manual (test) actuation, reported the number of relief valve blowdowns to the torus from the beginning of plant operation to that date.

The NMP1 SRVs discharging to the torus are the electromatic relief valves (ERVs). There were 74 ERV lifts from October 1969 to December 1973. For the period from January 1, 1974 through December 31, 1983, the number of ERV lifts was estimated based on the number of automatic scrams, since ERV lifts were not specifically tracked or reported during this time period. The number of automatic scrams was determined from the annual or monthly operating reports. It was assumed that all 6 ERVs lifted for each automatic scram. This method of estimation is conservative because examination of later LERs for scrams shows that ERVs do not lift for every automatic scram. There were 23 automatic scrams between January 1, 1974 and December 31, 1983, for an estimated 138 ERV lifts. There were 64 automatic, accidental, or retest (for valves initially failing surveillance testing) ERV lifts between January 1, 1984 and April 2005, or approximately 3 per year. The number of manual ERV lifts during routine surveillance testing between January 1974 and the present is estimated at 90, based on each valve being tested once per operating cycle times 15 operating cycles since 1974. The table below summarizes the data used to make the estimate.

Table 4.6-2
Total Estimated Number of ERV Lifts

Time Period	Type of Lift	Basis	ERV Lifts
October 1969 - December 1973	All lifts	Letter dated January 18, 1974	74
January 1974 - December 1983	Automatic (scram) plus retest	Monthly/Annual Operating Reports; 23 automatic scrams x 6 ERVs/scram = 138	138
January 1984 - April 2005	Automatic (scram) plus retest	LERs	64
1974 - present (April 2005)	Manual (test)	15 operating cycles x 6 ERVs tested each cycle	90
Total Estimated Number of Lifts			**366 ≈ 370**

Based on the sum of the actual and estimated ERV lifts, NMP1 has experienced approximately 370 ERV lifts to date.

For the remainder of plant operation, including the period of extended operation, ERV lifts are estimated based on the rate of ERV lifts per year from January 1984 through April 2005, or approximately 3 per year. The rate of future ERV lifts was estimated based on the ERV lift data from 1984 through 2005 because this data is thought to be more representative of future plant operation than the data on ERV lifts from 1969 through 1974. The earlier plant data includes ERV lifts that occurred during startup testing thus is not representative of the current operational trend. With 25 years of operation remaining (including the period of extended operation), the number of lifts is estimated to be 25 years x 3 lifts per year = 75 lifts.

Additionally, between April 2005 and the end of the period of extended operation, there will be 12 operating cycles. The manual testing of the ERVs for each of those cycles will add another 12 operating cycles x 6 manual ERV lifts per cycle = 72 lifts.

The total number of projected ERV lifts or cycles is then:

$370 + 75 + 72 = 517 \approx 520$

Therefore, the projected number of ERV lifts at the end of the period of extended operation is approximately 520.

Since the number of ERV lifts, which are the only contributor to fatigue usage for torus attached piping not caused by earthquake or accident, is projected to be slightly greater than the design number of ERV lifts, the estimated fatigue usage of the torus attached piping would be greater than that provided for in the design parameters. To ensure that fatigue usage of the torus attached piping and other torus locations does not exceed the design limits, NMP1 will add ERV lifts as a transient to be counted by the Fatigue Monitoring Program. The two highest usage torus attached piping locations (the 12-inch core spray suction line for Core Spray Pump 111 that enters the torus at penetration XS-337 and the 3-inch containment spray line that enters the torus at penetration XS-326) will be added as fatigue monitoring locations.

Section 3.3.9 of the PUAR (Reference 4.8-61) 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)(iii) – The effects of aging on the intended functions(s) will be adequately managed for the period of extended operation.

Since NMP will monitor ERV lifts to the torus under the Fatigue Monitoring Program to ensure that the fatigue usage of torus attached piping remains within design limits, the effects of aging on the piping intended function(s) will be adequately managed for the period of extended operation. If the monitoring of ERV lifts predicts that the 500 cycle limit will be challenged, corrective action will be taken sufficiently prior to that eventuality to either perform detailed analyses of the selected locations to ensure that the locations will not exceed a CUF of 1 or replace the piping at the affected locations, as necessary. Therefore, the effects of fatigue on the torus attached piping will be adequately managed in accordance with §54.21(c)(1)(iii).

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 design CUF for the liner for the original 40-year operating life of the containment is 0.054. The fatigue analysis covered the liner in the suppression pool area. For different loading conditions, the peak stresses occurred at different elevations, but for the purposes of determining fatigue usage, they were assumed to occur at the same elevation. The elevations of the peak stresses were 300 inches above the basemat for the operating basis earthquake (OBE) and safe shutdown earthquake (SSE), and 0.0 inches above the basemat for small break accident (SBA) plus intermediate break accident (IBA) pressure loading and design basis accident (DBA) pressure loading. For DBA and SBA/IBA temperature loads, the peak stress occurred at 44 inches above the basemat. Stress due to SRV loading was applied uniformly to the liner.

Table 4.6.3 shows the load events considered in the original fatigue analysis, the number of events and cycles per event assumed in 40 years, and the fatigue usage corresponding to each event. Safety/Relief Valve (SRV) actuation is the primary contributor to fatigue usage. The number of SRV actuations assumed for the original 40-year life in the liner stress analysis is 4,943. Actual SRV actuations are occurring at a far lower rate, with 182 SRV actuations recorded by December, 2002. Since NMP2 commenced operation in 1986, the plant has been in operation for about one quarter of its anticipated 60-year life. Multiplying 182 SRV actuations by four yields a lifetime number of actuations of 728, which is far less than the 4,943 actuations assumed in the original design. Other events that contribute to the CUF, such as a DBA, SBA, IBA, OBE, and SSE, have not occurred at all to date at NMP2. Therefore, since the trend for the number of occurrences of the events which contribute to the NMP2 containment liner CUF indicates that the numbers of design cycles assumed for 40 years is unlikely to be exceeded during a 60-year life, a simple projection to 60 years performed by multiplying the 40-year CUF by 1.5 is conservative. The projection yields a 60-year CUF of 0.081 (0.054 x 1.5 = 0.081). The NMP2 containment liner fatigue analysis has, therefore, been projected in accordance with 10 CFR 54.2l(c)(1)(ii).

Table 4.6.3
Load Cycles Considered in the NMP2 Containment Liner Analysis

Load Event	Events/40 years	Stress Cycles/Event	Fatigue Usage
Design Basis Loss of Coolant Accident (DBA)	1	1	~0 pressure load 0.0016 temperature load
Operating Basis Earthquake (OBE)	5	20	~0
Design Basis Earthquake (DBE)	1	20	~0
Safety Relief Valve Actuation (SRV)	4943	10	0.05
SRV+Seismic Event	15	10	Included with other load cases
Small or Intermediate Break Accident (SBA/IBA)	20	1	0.002 pressure load 0.001 temperature load
SRV+SBA/IBA	10	10	Included with other load cases
Operating Temperature	400	1	Not calculated since the criteria of ASME III, Div I, NB 3222.4(d) are met.
Operating Pressure	100	1	Not calculated since the criteria of ASME III, Div I, NB 3222.4(d) are met.

4.6.5 FATIGUE OF PRIMARY CONTAINMENT PENETRATIONS

NMP1 - Summary Description

The NMP1 drywell was designed as a Class B Vessel in accordance with Section III of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, 1965 Edition (ASME Section III, 1965). The 1965 Edition of the ASME Section III B&PV Code did not require fatigue analysis of Class B vessels. The drywell penetrations were considered an extension of the drywell and thus did not require fatigue analysis. For NMP1, fatigue of torus penetrations was addressed in the same analysis as the torus attached piping, the "Plant Unique Analysis Report of the Torus Attached Piping for Nine Mile Point Unit 1 Nuclear Generating Station," which was transmitted to the NRC in a letter dated May 22, 1984 (Reference 4.8-61). This analysis was performed in accordance with ASME Section III, 1977 Edition, through the Summer 1977 Addenda. Fatigue analyses were performed for the safety/relief valve (SRV) penetration (where the SRV line penetrates the vent header spherical intersection) and torus attached piping penetrations.

The fatigue analyses for the SRV and torus attached piping penetrations considered a number of cycles related to anticipated transients for the original 40-year life of the plant. The associated analyses satisfy the criteria of §54.3(a) and are TLAAs.

NMP1 - Analysis

For the SRV penetration, the fatigue evaluation was performed in accordance with paragraph NE-3221.5, Analysis for Cyclic Operation. This analysis showed that the maximum load could be cycled on the penetrations for at least 7500 cycles without exceeding code allowables. The event producing the maximum load was SRV Case C3.3 (second SRV actuation following a small or intermediate break accident with steam in the drywell), which would result in up to 50 SRV cycles. The number of these events considered in the design basis is only one. Normal SRV actuations produce substantially less load for up to 4500 effective stress cycles. Section 2.4.5 of the PUAR (Reference 4.8-61) indicates that since the 7500 cycles of maximum load bounds both of these by such a large margin, and since no other significant loads are imposed on the line, the penetration was assumed acceptable for fatigue without further evaluation.

The report forwarded by Reference 1 did not report a cumulative usage factor (CUF) for the SRV penetration. Considering only the fatigue usage from SRV Case C3.3, and assuming 7500 cycles of the maximum load would result in a CUF of 1.0, the 40-year CUF would be 0.0067. The contribution to the overall fatigue usage resulting from normal SRV actuations is assumed to be negligible. A simple linear projection of this value to 60 years performed by multiplying by 1.5 yields a CUF of 0.01. The fatigue usage from normal SRV actuations is considered negligible based on the Reference 4.8-61 fatigue analysis. Therefore, the NMP1 SRV penetration fatigue analysis has been projected to the end of the period of extended operation in accordance with 10 CFR 54.21(c)(1)(ii).

For the torus attached piping (TAP) penetrations, the fatigue evaluation, performed in accordance with paragraph NE-3221.5, showed the maximum load could be cycled on each penetration for at least 10,000 cycles without exceeding code allowables. Four bounding load cases were evaluated for the TAP penetrations. These load cases consider combinations of individual loading events including SRV discharge plus earthquake (during normal operation), SRV discharge plus earthquake plus chugging (during an intermediate/small break accident), condensation oscillation plus earthquake (during a design basis accident), and pool swell plus SRV discharge plus earthquake (during a design basis accident). The major loads that form the design basis for these load combinations are one cycle of pool swell, 900 cycles of design basis accident condensation oscillation (DBA.CO), and 50 cycles of SRV Case A1.2 (first actuation of any one valve during a small/intermediate break accident). Other loads such as normal SRV actuation, intermediate break accident condensation oscillation (IBA.CO), and chugging can produce up to 10,450 cycles, but only at greatly reduced stress levels. The value of 10,000 cycles at maximum stress was considered to represent a conservative level of evaluation and the TAP shell penetrations were considered acceptable for fatigue.

A CUF was not reported for the torus attached piping penetrations. However, considering the major loads listed above to be significant contributors to fatigue usage, each causing a load cycle equal to the maximum load, there are 951 significant loading events during the 40-year design life. Section 3.4.7 of the PUAR indicates that other loads such as normal SRV actuation, intermediate break accident condensation oscillation (IBA.CO), and chugging can cause up to 10,450 cycles, but only at greatly reduced stress levels; therefore, these loads are assumed to produce a negligible contribution to the overall fatigue usage of the penetrations. Assuming 10,000 cycles of the maximum load equates to a CUF of 1.0, the fatigue CUF resulting from these loads is 0.0951. Projecting this to 60 years by multiplying by 1.5, the 60-year fatigue usage is 0.143, which is well below the code allowable of 1.0.

<u>Disposition</u>: §54.21(c)(1)(ii) – The analyses have been projected to the end of the period of extended operation.

The number of anticipated significant transient cycles for a 40-year life divided by the maximum number of allowable cycles for the transient producing the maximum stress was used to estimate the 40-year design CUF. Linear projection of this CUF to 60 years results in a CUF far below the allowable. Therefore, the fatigue analysis of the torus attached piping penetrations has been projected to the end of the period of extended operation in accordance with §54.21(c)(1)(ii).

NMP2 - Summary Description

The NMP2 penetrations were designed in accordance with ASME Section III, therefore, fatigue analyses exist for all penetrations for the Class 1 and Class MC portions of the penetrations. Fatigue usage calculations for the process pipe, when required, and the associated penetration sleeve (Class MC portion) were performed together. Fatigue tolerant design is demonstrated for components with cumulative usage factors (CUFs) less than 1.0 (or less than 0.1 in break-exclusion zones). For the Class 1 portion of the penetration, additional pipe break postulation criteria are applied to high-energy piping with a CUF greater than 0.1.

NMP2 - Analysis

In general, the fatigue usage of the penetrations (either the process pipe or Class MC portion) is bounded by other locations in the same piping system and, thus, the penetration would not be selected as a fatigue monitoring location unless monitoring of the bounding location in the piping system indicated a problem. However, the six penetrations listed in Table 4.6.3 have CUFs that are not bounded by the CUFs for the adjoining piping.

Table 4.6-4
NMP2 Penetration Fatigue Monitoring Locations

Penetration	Class	40-Year Design CUF	Allowable
2RHS*Z9A	1	0.59	1.0
2CSL*Z16	1	0.5147	1.0
2ICS*Z19	MC	0.858	1.0
2SLS*Z29	1	0.4587	1.0
2MSS*Z2	1	0.0745	0.1
Reactor Core Isolation Cooling (RCIC) Return Line at 6" Refuel Bulkhead	1	0.58	1.0

The fatigue analyses for the NMP2 penetrations are based on the numbers of cycles as shown in Tables 4.6-4 and 4.6-5. Table 4.6-4 includes the transients that were considered for all penetrations while Table 4.6-5 contains the thermal transients specific to the individual penetrations.

Table 4.6-5
Transients Considered in the NMP2 Penetration Fatigue Analysis

Cycle Description	Number of Cycles	Comment
Safety/Relieve Valve (SRV) – Single Actuation	14,524	
SRV - Multiple Actuation	914	
Fluid Transient	15,438	Taken to be the same as the total number of SRV cycles
Test	31	
Operating Basis Earthquake (OBE)	100	Based on 5 OBEs with 20 stress cycles each

Table 4.6-6
Thermal Cycles Considered in the Penetration Fatigue Analysis

Penetration	Cycles Considered	Total Number of Cycles
2RHS*Z9A	Startup, shutdown, vessel unbolt, SRV blowdown	359
2CSL*Z16	Startup, shutdown, vessel unbolt, inadvertent actuation	972
2ICS*Z19	Sum of startup, turbine roll, scram, partial feedwater heater bypass, reduction to 0% power, hot standby, shutdown prior to vessel flooding, loss of feedwater pumps with isolation valves closed	863
2SLS*Z29	Design hydro test	130
2MSS*Z2	Startup (120) plus loss of feedwater (10)	130
Reactor Core Isolation Cooling (RCIC) Return Line at 6" Refuel Bulkhead	Vessel flood plus shutdown plus loss of feedwater with isolation valves closed	408

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 penetrations were shown to be less than the allowable values of 1.0 (or 0.1 in the break exclusion zone)[1], limiting locations are subject to change; thus ASME Class 1 piping and components require

[1] The break exclusion zone consists of those portions of high-energy fluid system piping between the moment limiting restraint(s) outside the outboard containment isolation valve and the moment limiting restraint(s) beyond the inboard containment isolation valve. The choice of the restraint(s) that define the limits of the break exclusion zone is based upon those restraint(s) which are necessary to ensure the operability of the primary containment isolation valves.

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) The 40-year design CUF for the penetration is 0.4 or greater, or 0.04 or greater in the break exclusion zone; and

2) The CUF of the penetration is not bounded by other locations in the same piping system.

Table 4.6-4 lists the penetration locations to be monitored. For these locations, 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. In addition, if a bounding location in the break exclusion zone 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 NMP2 primary containment penetrations included in the FMP will be adequately managed in accordance with §54.21(c)(1)(iii).

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 $1.95\text{x}10^{17}$ n/cm^2 at 8.72 EFPY, with an average flux value of $8.78\text{x}10^{8}$ 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 $1.45\text{x}10^{18}$ 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 ($e^{-0.24x}$) 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 $2.54\text{x}10^{17}$ 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 $5.07\text{x}10^{17}$ 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 $5.07\text{x}10^{17}$ 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 ($5.07\text{x}10^{17}$ 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 carbon 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 MSIV corrosion allowance is the additional wall thickness added to the minimum wall thickness to ensure the design minimum wall thickness is not violated during the life of the component.

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). Therefore, the calculation that determined this corrosion allowance satisfies the criteria of §54.3(a). As such, this analysis is a TLAA.

Analysis

MSIV wall thinning from corrosion can occur due to the combined effects of exposure to treated water, air, and FAC. Calculations performed to predict the potential NMP2 MSIV wall thinning predict that corrosion will consume approximately 21% of the 0.120 inch MSIV corrosion allowance over the projected 60 year life of the plant. This calculation assumed corrosion rates and durations as follows: 0.0033 inches per year for 4.6 years of exposure to air, 0.0050 inches per year for 0.66 years of exposure to treated water; and, 0.00013 inches per year for 54.7 years due to FAC.

The FAC corrosion rate used in the calculation described above is based on modeling done to support implementation of the CHECWORKS software. This modeling predicts average wear rates for representative components in the main steam system due to FAC during plant operation will be in the range of 0.00009 to 0.00013 inches per year. Using this method to predict FAC wear rates may introduce uncertainty into the predictions; however, the NMP2

MSIV calculation can be extrapolated to show that the MSIV corrosion allowance will be sufficient to support 60 years of operation even if the FAC wear rate is increased by more than 1400% (i.e., from 0.000130 inches per year to 0.00185 inches per year).

Although the calculation described above indicates the NMP2 MSIV corrosion allowance is sufficient to support operation throughout the period of extended operation, the MSIVs are included in the aging management programs for the main steam system. The primary aging management program for the main steam system is the NMP FAC Program which is described in LRA Section B2.1.9. Consistent with industry practice, the NMP FAC Program selects representative components and uses periodic measurements of these components to predict wear in other main steam system components including the MSIVs. The FAC Program does not require direct measurement of MSIV wall thickness because non-parallel inner and outer surfaces in the MSIV body make accurate and repeatable measurements of MSIV wall thickness difficult. The main steam system measurements will be performed and evaluated under the NMP FAC Program.

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 combination of calculations that predict the MSIV corrosion allowance is sufficient for the period of extended operation and the periodic wall thinning measurements of representative main steam components performed and evaluated under the NMP FAC Program create a high degree of assurance that unacceptable wall thinning in the NMP2 main steam system will either not occur or be detected and corrected in a timely manner. Therefore, the effects of aging on the NMP2 MSIV bodies will be adequately managed for the period of extended operation in accordance with § 54.21(c)(1)(iii).

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.

<u>Analysis</u>

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.

<u>Disposition</u>: §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 <u>BWR Vessel Internals Program</u> 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 Not Used

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

A0 INTRODUCTION

As required by 10 CFR 54.21(d), this appendix contains summary descriptions of the Aging Management Program activities and the Time-Limited Aging Analyses (TLAAs) for the period of extended operation. Following the issuance of the renewed operating licenses, Appendix A1 will be incorporated into the NMP1 Updated Final Safety Analysis Report (UFSAR) and Appendix A2 will be incorporated into the NMP2 Updated Safety Analysis Report (USAR).

A1 APPENDIX A1 – NMP1 UPDATED FINAL SAFETY ANALYSIS REPORT (UFSAR) SUPPLEMENT

A1.1 AGING MANAGEMENT PROGRAMS

A1.1.1 10 CFR 50 APPENDIX J PROGRAM

The 10 CFR 50 Appendix J Program detects degradation of the containment structure and components that comprise the containment pressure boundary, including seals and gaskets. Containment leak rate tests are performed to assure that leakage through the primary containment and systems and components penetrating primary containment does not exceed allowable leakage limits specified in the Technical Specifications. This program complies with Option B requirements of 10 CFR 50 Appendix J with plant-specific exceptions approved by the NRC as part of license amendments, and implements the guidelines provided in NRC Regulatory Guide (RG) 1.163 and NEI 94-01.

A1.1.2 ASME SECTION XI INSERVICE INSPECTION (SUBSECTION IWE) PROGRAM

The American Society of Mechanical Engineers (ASME) Section XI Inservice Inspection (Subsection IWE) Program (referred to herein as the IWE ISI Program) manages aging effects due to (1) corrosion of carbon steel components comprising the containment pressure boundary; and (2) degradation of containment pressure-retaining polymers. Program activities include visual examination, with limited surface or volumetric examinations when augmented examination is required. The IWE ISI Program is based on the 1998 edition of the ASME Boiler and Pressure Vessel Code, Section XI (Subsection IWE) for containment inservice inspection with plant-specific exceptions approved by the NRC. This is an exception to the evaluation in NUREG-1801 (which covers ASME Section XI requirements from both the 1992 edition with the 1992 addenda and the 1995 edition with the 1996 addenda).

The NMP1 ASME Section XI Inservice Inspection (Subsection IWE) Program is being enhanced to add an augmented VT-1 visual examination of the NMP1 containment penetration bellows. This inspection will be performed using enhanced techniques qualified for detecting SCC per NUREG-1611, Table 2, Item 12.

A1.1.3 ASME SECTION XI INSERVICE INSPECTION (SUBSECTION IWF) PROGRAM

The ASME Section XI Inservice Inspection (Subsection IWF) Program (referred to herein as the IWF ISI Program) manages aging of carbon steel component and piping supports, including ASME Class MC supports, due to general corrosion and wear. Program activities include visual examination to determine the general mechanical and structural condition of components and their supports. The IWF ISI Program is based on the 1989 edition of the ASME Boiler and Pressure Vessel Code, Section XI (Subsection IWF) for inservice inspection of supports and implements the alternate examination requirements of ASME Code Case N-491-1. These are exceptions to the evaluation in NUREG-1801 (which covers ASME Section XI requirements from the 1989 edition through the 1995 edition and addenda through the 1996 addenda).

A1.1.4 ASME SECTION XI INSERVICE INSPECTION (SUBSECTIONS IWB, IWC, IWD) PROGRAM

The ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program manages aging of Class 1, 2, or 3 pressure-retaining components and their integral attachments. Program activities include periodic visual, surface, and/or volumetric examination and pressure tests of Class 1, 2 and 3 pressure-retaining components. The ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program is based on ASME Section XI, 1989 edition, with no Addenda and ASME Section XI, Appendix VIII, 1995 Edition through 1996 Addenda. Examination categories B-F, B-J, C-F-1, C-F-2 and IGSCC Category A are inspected using the EPRI risk-informed methodology and implemented in accordance with ASME Code Case N-578-1 as approved by NRC plant-specific Relief Request These are exceptions to the program described in NUREG-1801 (which cites ASME Section XI requirements covered in the 1995 edition through 1996 addenda).

A1.1.5 BORAFLEX MONITORING PROGRAM

The Boraflex Monitoring Program is an existing program that manages degradation of neutron absorbing material in spent fuel pool storage racks resulting from radiation exposure and possible water ingress. Program activities include (1) inspection of the test coupons to detect dimensional changes, (2) correlation of measured levels of silica in the spent fuel pool with analysis using a predictive code (e.g., RACKLIFE) to estimate boron loss from Boraflex panels; and (3) neutron attenuation testing to measure the boron areal density of the short-length test coupons. The Boraflex Monitoring Program is based on existing technology and methods for testing and evaluating material properties necessary to ensure the required 5% margin to criticality in the spent fuel pool is maintained. The Boraflex Monitoring Program for NMP1 will be enhanced to perform periodic in-situ neutron attenuation testing and measurement of boron areal density for those boraflex racks that remain in use during the period of extended operation.

Enhancements will be completed prior to the period of extended operation..

A1.1.6 BURIED PIPING AND TANKS INSPECTION PROGRAM

The Buried Piping and Tanks Inspection Program is a new program that will manage the aging effects on the external surfaces of carbon steel, low-alloy steel, and cast iron components (e.g. tanks, piping) that are buried in soil. Program activities will include visual inspections of external coatings and wrappings to detect damage and degradation. Periodicity of inspections will be based on plant operating experience and opportunities for inspection due to maintenance. If an opportunistic inspection does not occur within the first ten years of extended operation, NMPNS will excavate a representative sample for the purpose of inspection. This program will be implemented prior to the period of extended operation.

A1.1.7 BWR FEEDWATER NOZZLE PROGRAM

The NMP1 Feedwater Nozzle Programs is an existing program that requires UT inspections of the feedwater nozzles every 10 years to verify the nozzles are acceptable for continued service.

The Feedwater Nozzle Program is implemented through the Inservice Inspection (ISI) Program which, at the time the license renewal application was submitted, conformed to the requirements in American Society of Mechanical Engineers (ASME) Code, Section XI, Subsection IWB, Table IWB 2500-1 (1989 Edition no Addenda), and ASME Section XI, Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," 1995 Edition through 1996 Addenda. NUREG-1801, Section XI.M5, identifies the 1995 edition (including the 1996 addenda) of ASME Section XI as the basis for the GALL feedwater nozzle program. The Inservice Inspection (ISI) Programs will not comply with the Edition and Addenda of ASME Section XI cited in the GALL because the programs are updated to the latest Edition and Addenda of ASME Section XI, as mandated by 10 CFR 50.55a, prior to the start of each inspection interval.

UT and PT inspections required by NUREG-0619 have been superseded because the inspections are now performed in accordance with ASME Section XI, Appendix VIII.

A1.1.8 BWR PENETRATIONS PROGRAM

The BWR Penetrations Program manages the effects of cracking in the various penetrations of the reactor pressure vessels at NMPNS. The BWR Penetrations Program is based on guidelines issued by the BWR Vessel and Internals Project (BWRVIP) and approved by the NRC. This program is implemented by the BWR Vessel Internals Program for managing specific aging effects. The attributes of the BWR Penetrations Program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program.

A1.1.9 BWR REACTOR WATER CLEANUP SYSTEM PROGRAM

The BWR Reactor Water Cleanup System Program manages the effects of stress corrosion cracking or intergranular stress corrosion cracking on the intended function of austenitic stainless steel piping in the reactor water cleanup system. This program is based on the NRC criteria related to inspection guidelines for RWCU piping welds outboard of the second isolation valve as delineated in NUREG-0313, Revision 2, and Generic Letter 88-01. An exception is taken to the Acceptance Criteria program element in that NMP1 utilizes the 1989 edition with no addenda of the ASME Section XI code versus the 1995 edition through the 1996 addenda as defined in the GALL. The attributes of the BWR Reactor Water Cleanup System Program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program.

A1.1.10 BWR STRESS CORROSION CRACKING PROGRAM

The BWR Stress Corrosion Cracking (SCC) Program manages intergranular stress corrosion cracking in reactor coolant pressure boundary piping made of stainless steel as delineated in NUREG-0313, Revision 2, and Generic Letter 88-01 and its Supplement 1, as modified by BWRVIP-75. Augmented inspections are performed in accordance with these documents. An exception to the program described in NUREG-1801 is that the acceptance criteria for the NMP BWR SCC program are based upon the 1989 edition of the ASME Section XI code versus the 1995 edition through the 1996 addenda as described in NUREG-1801. The attributes of the BWR SCC program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program.

A1.1.11 BWR VESSEL ID ATTACHMENT WELDS PROGRAM

The BWR Vessel ID Attachment Welds Program manages the effects of cracking in reactor pressure vessel inside diameter attachment welds. This program is based on industry guidelines issued by the BWRVIP and approved by the NRC. The BWR Vessel ID Attachment Welds Program is implemented by the BWR Vessel Internals Program for managing specific aging effects. The attributes of the BWR Vessel ID Attachment Welds Program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program.

A1.1.12 BWR VESSEL INTERNALS PROGRAM

The BWR Vessel Internals Program manages aging of materials inside the reactor vessel. Program activities include (1) inspections for the presence and effects of cracking; and (2) monitoring and control of water chemistry. This program is based on guidelines issued by the BWRVIP and approved (or pending approval[6]) by the NRC. Inspections and evaluations of reactor vessel components are consistent with the guidelines provided in the following BWRVIP reports:

BWRVIP-18, BWR Core Spray Internals Inspection and Flaw Evaluation Guidelines

BWRVIP-25, BWR Core Plate Inspection and Flaw Evaluation Guidelines

BWRVIP-26, BWR Top Guide Inspection and Flaw Evaluation Guidelines

BWRVIP-27, BWR Standby Liquid Control System/Core Plate ΔP Inspection and Flaw Evaluation Guidelines

BWRVIP-38, BWR Shroud Support Inspection and Flaw Evaluation Guidelines

BWRVIP-47, BWR Lower Plenum Inspection and Flaw Evaluation Guidelines

BWRVIP-48, Vessel ID Attachment Weld Inspection and Flaw Evaluation Guidelines

BWRVIP-49, Instrument Penetration Inspection and Flaw Evaluation Guidelines

BWRVIP-74, BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines

BWRVIP-76, BWR Core Shroud Inspection and Flaw Evaluation Guidelines

[6] NRC review of BWRVIP-76 is not yet complete.

NMP1 has completed, or will complete, each of the license renewal applicant action items described in the NRC safety evaluations for these BWRVIP reports. In addition, NMP1 will implement the NRC approved inspection and flaw evaluation guidelines for the steam dryer and inaccessible core spray component welds when issued. The attributes of the BWR Vessel Internals Program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program.

Enhancements to the BWR Vessel Internals Program include the following revisions to existing activities that are credited for license renewal:

- A schedule for additional inspections of the top guide locations (using EVT-1 or techniques demonstrated to be appropriate in BWRVIP-03) will be implemented. A minimum of 10% of the locations will be inspected within 12 years of the beginning of the period of extended operation, with at least 5% of the inspections completed within 6 years.
- NMPNS will implement the resolution of the open item documented in BWRVIP-18 regarding the inspection of inaccessible welds for core spray. It will be included in the BWRVIP response to be reviewed and accepted by the NRC.
- Once the guidelines for inspection and evaluation for steam dryers currently under development by the BWRVIP committee are documented, reviewed and accepted by the NRC, the actions will be implemented in accordance with the BWRVIP program.
- The baseline inspections recommended in BWRVIP-47 for the BWR lower plenum components will be incorporated into the program.
- NMP will follow the status of the proposed ASME Code change with respect to allowing roll/expansion techniques of CRD stub tubes, and will implement the final code change or provide an alternative plan for the NMP1 period of extended operation. This will be accomplished at least 1 year prior to the expiration of the current operating license.
- Maintenance procedures for the inspection of the Orificed Fuel Support (OFS) casting will be enhanced to include a sample VT-1 inspection of the casting and an EVT-1 inspection if any evidence of impact or mishandling is identified.

Enhancements will be completed prior to the period of extended operation.

A1.1.13 CLOSED-CYCLE COOLING WATER SYSTEM PROGRAM

The Closed-Cycle Cooling Water System (CCCWS) Program manages loss of material and fouling of components exposed to closed-cycle cooling water environments. The applicable piping systems include the Reactor Building Closed Loop Cooling System, Control Room HVAC System, the heat exchanger jacket water cooling portions of the Emergency Diesel Generator System. Also included are portions of non-safety related systems credited in the aging management review. Program activities include chemistry monitoring, surveillance testing, data trending, and component inspections. The CCCWS Program implements the guidelines for controlling system performance and aging effects described in Electric Power Research Institute (EPRI) Report TR-107396.

Enhancements to the CCCWS Program include the following revisions to existing activities that are credited for license renewal:

- Direct periodic inspections to monitor for loss of material in the piping of the CCCW systems.
- Implement a corrosion monitoring program for larger bore CCCW piping not subject to inspection under another program.
- Establish periodic monitoring, trending, and evaluation of performance parameters for the Reactor Building Closed Loop Cooling and Control Room HVAC Systems.
- Implement a program to use corrosion inhibitors in the Reactor Building Closed Loop Cooling System and Control Room HVAC System in accordance with the guidelines given in EPRI TR-107396.
- Establish the frequencies to inspect for degradation of components in CCCW Systems, including heat exchanger tube wall thinning.
- Perform a heat removal capability test for the Control Room HVAC System at least every 5 years.
- Expand periodic chemistry checks of CCCW Systems consistent with the guidelines of EPRI TR-107396.
- Provide the controls and sampling necessary to maintain water chemistry parameters in CCCW Systems within the guidelines of EPRI Report TR-107396.

- Ensure acceptance criteria are specified in the implementing procedures for the applicable indications of degradation.

Enhancements will be completed prior to the period of extended operation.

A1.1.14 COMPRESSED AIR MONITORING PROGRAM

The Compressed Air Monitoring Program manages aging effects for portions of the Compressed Air Systems within the scope of license renewal, including cracking and loss of material due to general corrosion, by controlling the internal environment of systems and components. Program activities include air quality checks at various locations to detect contaminants that would affect the system's intended function. Additional visual inspections are credited for identification and monitoring of degradation for air compressors, receivers, and air dryers. The Compressed Air Monitoring Program is based on Generic Letter (GL) 88-14 and recommendations presented in INPO Significant Operating Event Report 88-01. The program also includes good practice elements of the general maintenance and inspection activities for the compressor, receiver, and air drier discussed in EPRI TR-108147 (revision to EPRI NP-7079) and ASME OM-S/G-1998, Part 17. However, specific exception is taken to any maintenance recommended in EPRI TR-108147 that is not also endorsed by the equipment manufacturers, and to the preservice and inservice testing guidelines of ASME OM-S/G-1998, Part 17. This is an exception to the program described in NUREG-1801.

Enhancements to the Compressed Air Monitoring Program include the following revisions to existing activities that are credited for license renewal:

- Develop new activities to manage the loss of material, stress corrosion cracking, and perform periodic system leak checks.

- Expand the scope, periodicity, and inspection techniques to ensure that the aging of certain sub-components of the dryers and compressors (e.g., valves, heat exchangers) is managed.

- Establish activities that manage the aging of the internal surfaces of carbon steel piping and that require system leak checks to detect deterioration of the pressure boundaries.

- Expand the acceptance criteria to ensure that the aging of certain sub-components of the dryers and compressors (e.g., valves, heat exchangers) is managed.

- Develop and implement the activities to address the failure mechanism of stress corrosion cracking in unannealed red brass piping in NMP1.

Enhancements will be completed prior to the period of extended operation.

A1.1.15 ENVIRONMENTAL QUALIFICATION PROGRAM

The Environmental Qualification (EQ) Program manages thermal, radiation, and cyclical aging for electrical equipment important to safety and located in harsh plant environments at NMPNS. Program activities (1) identify applicable equipment and environmental requirements; (2) establish, demonstrate, and document the level of qualification (including configuration, maintenance, surveillance, and replacement requirements); and (3) maintain (or preserve) qualification. The EQ Program employs aging evaluations based on 10 CFR 50.49(f) qualification methods. Components in the EQ Program must be refurbished, replaced, or have their qualification extended prior to reaching the aging limits established in the evaluation.

A1.1.16 FATIGUE MONITORING PROGRAM

The Fatigue Monitoring Program (FMP) is an existing program that manages the fatigue life of reactor coolant pressure boundary components by tracking and evaluating key plant events. The FMP monitors operating transients to date, calculates cumulative usage factors to date, and directs performance of engineering evaluations to develop preventive and mitigative measures in order not to exceed the design limit on fatigue usage.

The FMP will be enhanced with guidance for the use of the FatiguePro software package and updated methodology for environmental fatigue factors in establishing updated fatigue life calculations for components, and to add safety relief valve actuations for NMP1 as a monitored transient. These enhancements will be completed prior to the period of extended operation.

A1.1.17 FIRE PROTECTION PROGRAM

The Fire Protection Program provides guidance for performance of periodic visual inspections to manage aging of the various materials comprising rated fire barriers. These include (a) sealants in rated penetration seals (subject to shrinkage due to weathering); (b) concrete and steel in fire rated walls, ceilings, and floors (subject to loss of material due to flaking and abrasion; separation and concrete damage due to relative motion, vibration, and shrinkage); and (c) steel in rated fire doors (subject to loss of material due to corrosion and wear or mechanical damage). In addition this program requires testing of the diesel-driven fire pump to verify that it is performing its intended function. This activity manages aging of the fuel oil supply line to and the exhaust system from the diesel engine, both of which may experience loss of material due to corrosion. Inspection and testing is performed in accordance with the guidance of applicable standards.

NMP takes two exceptions to the Fire Protection Program as described in NUREG-1801. NMP will perform inspections on hollow metal fire doors on a plant specific schedule and will not use valve lineups for aging management of fire suppression systems. These exceptions are consistent with ISG-04.

The Fire Protection Program will be enhanced to include periodic visual inspections of piping and fittings in a non-water environment in the Halon and Carbon Dioxide fire suppression systems components to detect signs of degradation. Additionally, periodic functional tests of the diesel-driven fire pump will be enhanced to include inspection of engine exhaust system components to verify that loss of material is managed. Finally, the fire door inspection frequency will be determined by a plant specific analysis. These enhancements will be completed prior to the period of extended operation.

A1.1.18 FIRE WATER SYSTEM PROGRAM

The Fire Water System Program manages aging of water-based fire protection systems due to loss of material and biofouling. Program activities include periodic maintenance, testing, and inspection of system piping and components containing water (e.g., sprinklers, nozzles, fittings, valves, hydrants, hose stations, standpipes). Inspection and testing is performed in accordance with the guidance of applicable National Fire Protection Association (NFPA) Codes and Standards and the Nuclear Electric Insurance Limited (NEIL) Members' Manual.

Enhancements to the Fire Water System Program include the following revisions to existing activities that are credited for license renewal:

- Incorporate inspections to detect and manage loss of material due to corrosion into existing periodic test procedures.
- Specify periodic component inspections to verify that loss of material is being managed.
- Add procedural guidance for performing visual inspections to monitor internal corrosion and detect biofouling.
- Add requirements to periodically check the water-based fire protection systems for microbiological contamination.

- Measure fire protection system piping wall thickness using non-intrusive techniques (e.g., volumetric testing) to detect loss of material due to corrosion.

- Establish an appropriate means of recording, evaluating, reviewing, and trending the results of visual inspections and volumetric testing.

- Define acceptance criteria for visual inspections and volumetric testing.

Enhancements will be completed prior to the period of extended operation.

A1.1.19 FLOW-ACCELERATED CORROSION PROGRAM

The Flow-Accelerated Corrosion (FAC) Program (also referred to as the Erosion/Corrosion Program) manages aging effects due to flow-accelerated corrosion in carbon steel and low alloy steel piping containing single-phase and two-phase high-energy fluids. Program activities include (1) analysis using a predictive code (CHECWORKS) to determine critical locations, (2) baseline inspections to determine the extent of thinning at the selected locations, (3) follow-up inspections to confirm the predictions, and (4) repair or replacement of components, as necessary. The program considers the recommended actions in NRC Bulletin 87-01 and Information Notice 91-18, and implements the guidelines for an effective FAC Program presented in EPRI Report NSAC-202L-R2. The program also implements the recommendations provided in GL 89-08, *Erosion/Corrosion Induced Pipe Wall Thinning.*

A1.1.20 FUEL OIL CHEMISTRY PROGRAM

The Fuel Oil Chemistry Program manages loss of material due to corrosion that may result from introduction of contaminants into the plant's fuel oil tanks. Program activities include (1) sampling and chemical analysis of the fuel oil inventory at the plant, (2) sampling, testing, and analysis of new fuel oil as it is unloaded at the plant, and (3) cleaning and inspection of fuel oil tanks. The Fuel Oil Chemistry Program is based on maintaining fuel oil quality in accordance with the guidelines of American Society for Testing Materials (ASTM) Standards D975, D1796, D2276, and D4057.

The Fuel Oil Chemistry Program takes exceptions to NUREG-1801, Section XI.M30 (Fuel Oil Chemistry Program) evaluation elements.

- NMP 1 takes exception to using both ASTM D 1796 and ASTM D 2709 to determine the concentration of water and sediment in the diesel fuel oil tanks. NMP 1 uses only the guidance given in ASTM D 1796.

- NMP 1 takes exception to using the *modified* ASTM D 2276, Method A which specifies a pore size of 3.0 μm. NMP 1 uses a filter with a pore size of 0.8 μm as specified in ASTM D 2276.

- NMP 1 takes exception to multilevel sampling in the diesel fuel oil tanks. The physical configuration of the fuel oil tanks does not allow a representative fuel oil sample to be taken at multiple levels.

- NMP 1 takes exception to periodically sampling the fuel oil day tanks. These small tanks do not have a provision for sampling.

Enhancements to the Fuel Oil Chemistry Program include the following revisions to existing activities that are credited for license renewal:

- Incorporate periodic tests for microbiological organisms.

- Add a requirement for quarterly trending of particulate contamination analysis results.

- Add requirements to periodically inspect the interior surfaces of the emergency diesel generator fuel oil tanks and diesel fire pump fuel oil day tank for evidence of significant degradation, including a requirement that the tank bottom thickness be determined.

- Provide guidelines for the appropriate use of biocides, corrosion inhibitors, and fuel stabilizers to maintain fuel oil quality.

- Ensure acceptance criteria are specified in the implementing procedures for the applicable indications of potential degradation.

Enhancements will be completed prior to the period of extended operation.

A1.1.21 FUSE HOLDER INSPECTION PROGRAM

The Fuse Holder Inspection Program is a new plant-specific program that applies to fuse holders located outside of active devices that have aging effects requiring management. This program requires testing to detect deterioration of metallic clamps that would affect the ability of in-scope fuse holders to perform their intended function. The Fuse Holder Inspection Program includes the following aging stressors: moisture, fatigue, ohmic heating, mechanical stress, vibration, thermal cycling, electrical transients, chemical contamination, oxidation, and corrosion.

Analytical trending will not be included in this activity because the parameters monitored may vary depending upon the test method selected. This is an exception to the "Monitoring and Trending" element in Appendix A.1.2.3.5 to NUREG-1800, but is consistent with the latest regulatory and industry License Renewal precedence. This program will be implemented prior to the period of extended operation.

A1.1.22 INSPECTION OF OVERHEAD HEAVY LOAD AND LIGHT LOAD HANDLING SYSTEMS PROGRAM

The Inspection of Overhead Heavy Load and Light Load Handling Systems Program (referred to herein as the Crane Inspection Program) manages loss of material due to corrosion of cranes within scope of license renewal (WSLR). Program activities include (1) performance of various maintenance activities on a specified frequency; and (2) pre-operational inspections of equipment prior to lifting activities. Crane inspection activities are based on the mandatory requirements of applicable industry standards and implement the guidance of NUREG-0612.

The Crane Inspection Program will be enhanced to add specific direction for performance of pre-lift corrosion inspections of certain hoist lifting assembly components. The enhancement will be completed prior to the period of extended operation.

A1.1.23 MASONRY WALL PROGRAM

The Masonry Wall Program manages aging effects so that the evaluation basis established for each masonry wall WSLR remains valid through the period of extended operation. The Masonry Wall Program is based on the structures monitoring requirements of 10 CFR 50.65. The Masonry Wall Program is implemented by the Structures Monitoring Program for managing specific aging effects.

A1.1.24 NON-EQ ELECTRICAL CABLES AND CONNECTIONS PROGRAM

The Non-EQ Electrical Cables and Connections Program is a new program that manages aging of cables and connectors WSLR exposed to adverse localized temperature, moisture, or radiation environments. Program activities include periodic visual inspection of susceptible cables for evidence of cable and connection jacket surface anomalies. This program will be implemented prior to the period of extended operation.

A1.1.25 NON-EQ ELECTRICAL CABLES AND CONNECTIONS USED IN INSTRUMENTATION CIRCUITS PROGRAM

The Non-EQ Electrical Cables Used in Instrumentation Circuits Program manages aging of cables and connections exposed to adverse localized temperature and radiation environments that could result in loss of insulation resistance. It applies to accessible and inaccessible electrical cables that are not in the EQ Program and are used in circuits with sensitive, high-voltage, low-level signals such as radiation monitoring, nuclear instrumentation, and other such cables subject to aging management review that are sensitive to a reduction in insulation resistance . Activities include routine calibration tests of instrumentation loops or direct testing of the cable system in those cases where cable testing is conducted as an alternate to surveillance testing, and in either case are implemented through the Surveillance Testing and Preventive Maintenance Programs. Testing is based on requirements of the particular calibrations, surveillances or testing performed on the specific instrumentation circuit or cable and is implemented through the work control system. Where cable testing is conducted as an alternate to surveillance testing the acceptance criteria for each test will be defined by the specific type of test performed and the specific cable tested.

Enhancements to the Non-EQ Electrical Cables Used in Instrumentation Circuits Program include the following revisions to existing activities that are credited for license renewal:

- Implement reviews of calibration or surveillance data for indications of aging degradation affecting instrument circuit performance. The first reviews will be completed prior to the period of extended operation and every ten years thereafter.

- In cases where a calibration or surveillance program does not include the cabling system in the testing circuit, or as an alternative to the review of calibration results described above, provide requirements and procedures to perform cable testing to detect deterioration of the insulation system, such as insulation resistance tests or other testing judged to be effective in determining cable insulation condition. The first test will be completed prior to the period of extended operation. The test frequency of these cables shall be determined based on engineering evaluation not to exceed every 10 years.

Enhancements will be completed prior to the period of extended operation.

A1.1.26 DELETED

A1.1.27 NON-SEGREGATED BUS INSPECTION PROGRAM

The Non-Segregated Bus Inspection Program is an existing plant-specific program that manages aging effects for components and materials internal to the non-segregated bus ducts that connect the reserve auxiliary transformers to the 4160V buses required for the recovery of offsite power following a Station Blackout (SBO) event. Based upon the most recent industry and regulatory license renewal precedence this program also includes normally energized bus ducts associated with boards feeding components WSLR. These normally-energized components are not subject to the environmental qualification requirements of 10 CFR 50.49, but can be affected by elevated temperatures prior to the end of the period of extended operation. Program activities include visual inspections of internal portions of the bus ducts to detect cracks, corrosion, debris, dust, and moisture; visual inspections of the bus insulating system to detect embrittlement, cracking, melting, swelling, and discoloration; visual inspections of bus supports (insulators) to detect cracking and lack of structural integrity; and a torque test or a resistance test of a sample of accessible bolted connections. The program considers the technical information and guidance provided in applicable industry publications.

Analytical trending is not included in this activity because the ability to trend inspection results is limited. This is an exception to the "Monitoring and Trending" element in Appendix A.1.2.3.5 to NUREG-1800.

Enhancements to the Non-Segregated Bus Inspection Program include expanded visual inspections of the bus ducts, their supports and insulation systems, as well as the performance of low range resistance checks of the bus ducts or torque checks from a statistical sample of accessible bolted connections.

Enhancements will be implemented prior to the period of extended operation.

A1.1.28 ONE-TIME INSPECTION PROGRAM

The One-Time Inspection Program is a new program that manages aging effects with potentially long incubation periods for susceptible components WSLR. Program activities include visual, volumetric, and other established inspection techniques consistent with industry practice to provide a means of verifying that an aging effect is either (1) not occurring, or (2) progressing so slowly that it has a negligible effect on the intended function of the structure or component. The program also provides measures for verifying the effectiveness of existing aging management programs. This program is a new program that will be implemented prior to the period of extended operation.

A1.1.29 OPEN-CYCLE COOLING WATER SYSTEM PROGRAM

The Open-Cycle Cooling Water System (OCCWS) Program manages aging of components exposed to raw, untreated (e.g., service) water. This includes portions of the Service Water (SW) system associated with the emergency SW pumps internal components of the Reactor Building Closed Loop Cooling (RBCLC) heat exchangers, the raw cooling water portions of the emergency Diesel Generator (DG) and Containment Spray (CTN-SP) systems portions of the Circulating Water (CW) system required to support the raw water supply.

Program activities include (a) surveillance and control of biofouling (including biocide injection), (b) verification of heat transfer capabilities for components cooled by the Service Water System, (c) inspection and maintenance, (d) walkdown inspections, and (e) review of maintenance, operating and training practices and procedures. Inspections may include visual, Ultrasonic Testing (UT), and Eddy Current Testing (ECT) methods. This program is based on the recommendations of GL 89-13.

Enhancements to the Open Cycle Cooling Water System Program include the following activities that are credited for license renewal:

- Ensure that the applicable NMP 1 commitments made for GL 89-13, and the requirements in NUREG-1801, Section XI.M20 are captured in the NMP 1 implementing documents for GL 89-13.
- Where the requirements of the NUREG-1801, Section XI.M20 are more conservative than the GL 89-13 commitments, they will be incorporated into the OCCWS program.
- Revise NMP 1 preventive maintenance and heat transfer performance test procedures to incorporate specific inspection criteria, corrective actions, and frequencies.

Enhancements will be completed prior to the period of extended operation.

A1.1.30 PREVENTIVE MAINTENANCE PROGRAM

The scope of the Preventive Maintenance (PM) Program includes, but is not limited to, valve bodies, heat exchangers, expansion joints, tanks, ductwork, fan/blower housings, dampers, and pump casings. This program provides for performance of various maintenance activities on a specified frequency based on vendor recommendations and operating experience. These activities provide opportunities for component condition monitoring to manage the effects of aging for many SSCs WSLR.

Enhancements to the PM Program include the following revisions to existing activities that are credited for license renewal:

- Expand the PM Program to encompass activities for certain additional components identified as requiring aging management.
- Explicitly define the aging management attributes, including the systems and the component types/commodities included in the program.
- Specifically list activities credited for aging management, parameters monitored, and the aging effects detected.
- Establish a requirement that inspection data be monitored and trended.
- Establish detailed parameter-specific acceptance criteria.

Enhancements will be completed prior to the period of extended operation.

A1.1.31 Reactor Head Closure Studs Program

The Reactor Head Closure Studs Program manages cracking of and loss of material from the reactor pressure vessel closure studs. This program implements the preventive measures of Regulatory Guide 1.65. Inservice examinations are performed in accordance with the 1989 edition of the ASME Boiler and Pressure Vessel Code with no Addenda, and ASME Section XI, Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," 1995 Edition through 1996 Addenda as approved by the NRC in plant-specific exemptions. This is an exception to the program described in NUREG-1801 (which cites ASME Section XI requirements covered in the 1995 edition through 1996 addenda).

A1.1.32 REACTOR VESSEL SURVEILLANCE PROGRAM

The Reactor Vessel Surveillance Program is an existing program that manages loss of fracture toughness due to neutron irradiation embrittlement in the Reactor Pressure Vessel (RPV) beltline material. Program activities include (1) periodic withdrawal and testing of surveillance capsules from the RPV; (2) use of test results and allowable stress loadings for the ferritic RPV materials to determine operating limits; and (3) comparison with a large industry data set to confirm validity of test results. Analysis and testing are based on the requirements of 10 CFR 50, Appendix H, and ASTM Standard E-185. NMPNS commits to implement the Integrated Surveillance Program (ISP) described in BWRVIP-116 (if approved by the NRC staff). When the NRC issues a final safety evaluation report (SER) for BWRVIP-116, NMPNS will address any open items and complete the SER Action Items. Should BWRVIP-116 not be approved by the NRC, a plant specific reactor vessel surveillance program will be submitted to the NRC two years prior to commencement of the period of extended operation.

Enhancements to the Reactor Vessel Surveillance Program include the following revisions to existing activities that are credited for license renewal:

- Incorporate the requirements and elements of the ISP, as documented in BWRVIP-116 if approved by the NRC, or an NRC approved plant-specific program, into the Reactor Vessel Surveillance Program, and include a requirement that if NMPNS surveillance capsules are tested, the tested specimens will be stored in lieu of optional disposal.

- Project analyses of upper shelf energy and pressure-temperature limits to 60 years using methods prescribed by Regulatory Guide 1.99, Revision 2, and include the applicable bounds of the data, such as operating temperature and neutron fluence.

Enhancements will be completed prior to the period of extended operation.

A1.1.33 SELECTIVE LEACHING OF MATERIALS PROGRAM

The Selective Leaching of Materials Program is a new program that manages aging of components susceptible to selective leaching. The potentially susceptible components include valve bodies, valve bonnets, pump casings, and heat exchanger components in various systems. This program will be implemented through the One Time Inspection Program prior to the period of extended operation.

A1.1.34 STRUCTURES MONITORING PROGRAM

The Structures Monitoring Program manages aging of structures, structural components, and structural supports WSLR. The program provides for periodic visual inspections, surveys, and examination of all safety related buildings (including the primary containment and substructures within the primary containment) and various other buildings WSLR. Program activities identify degradation of materials of construction, which include structural steel, concrete, masonry block, sealing materials. While not credited for mitigation of aging, protective coatings are also inspected under this program. The Structures Monitoring Program, which was initially developed to meet the regulatory requirements of 10 CFR 50.65, implements guidance provided in Regulatory Guide 1.160, NUMARC 93-01 and NEI 96-03.

Enhancements to the Structures Monitoring Program include the following revisions to existing activities that are credited for license renewal:

- Expand the parameters monitored during structural inspections to include those relevant to aging effects requiring management identified for structural bolting.
- Implement regularly scheduled ground water monitoring to ensure that a benign environment is maintained.
- Expand the scope of the program to include the steel electrical transmission towers required for the SBO recovery path that are WSLR, but not within the current scope of 10 CFR 50.65.

Enhancements will be completed prior to the period of extended operation.

A1.1.35 SYSTEMS WALKDOWN PROGRAM

The Systems Walkdown Program manages aging effects for accessible external surfaces of pumps, valves, piping, bolts, heat exchangers, tanks, HVAC components, and other components. Visual inspections identify corrosion, changes in material properties, signs of material degradation, and leakage. The program also identifies adverse conditions that can lead to aggressive environments for systems and components within the scope of LR. Program activities include system engineer walkdowns (i.e., field evaluations of system components to assess material condition), documentation and evaluation of inspection results, and appropriate corrective actions.

- Enhancements to the Systems Walkdown Program include the following revisions to existing activities that are credited for license renewal:Train all personnel performing inspections in the Systems Walkdown Program to ensure that age related degradation is properly identified and incorporate this training into the site training program.
- Specify acceptance criteria for visual inspections to ensure aging related degradation is properly identified and corrected.

Enhancements will be completed prior to the period of extended operation.

A1.1.36 TORUS CORROSION MONITORING PROGRAM

The Torus Corrosion Monitoring Program manages corrosion of the NMP1 suppression chamber (torus) through inspection and analysis. This program provides for (1) determination of torus shell thickness through ultrasonic measurement; (2) determination of corrosion rate through analysis of material coupons; and (3) visual inspection of accessible external surfaces of the torus support structure for corrosion. The Torus Corrosion Monitoring Program ensures that the NMP1 torus shell and support structure thickness limits are not exceeded.

A1.1.37 WATER CHEMISTRY CONTROL PROGRAM

The Water Chemistry Control Program manages aging effects by controlling the internal environment of the reactor water, feedwater, condensate, and control rod drive systems, and related auxiliaries (such as the torus, condensate storage tank, and spent fuel pool). The aging effects of concern are (1) loss of material and (2) crack initiation and growth. Program activities include monitoring and controlling concentrations of known detrimental chemical species below the levels known to cause degradation. The Water Chemistry Control Program implements the guidelines for BWR water chemistry presented in EPRI Reports TR-103515-R1 and TR-103515-R2. This is an exception to the program described in NUREG-1801 (which identifies EPRI TR-103515-R0 as the basis for BWR water chemistry programs).

A1.1.38 BOLTING INTEGRITY PROGRAM

The Bolting Integrity Program manages aging effects due to loss of preload, cracking and loss of material of bolting within the scope of license renewal including safety-related bolting, bolting for NSSS component supports, bolting for other pressure retaining components, and structural bolting. Program activities include periodic inspections of bolting for indication of loss of preload, cracking and loss of material due to corrosion, rust, etc. This program is based on the guidelines delineated in NUREG-1339 and the guidance contained in EPRI NP-5769, with exceptions noted in NUREG-1339, for safety-related bolting and EPRI TR-104213 for other bolting.

The Bolting Integrity Program is implemented through the ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program, ASME Section XI Inservice Inspection (Subsection IWE) Program, ASME Section XI Inservice Inspection (Subsection IWF) Program, Structures Monitoring Program, Preventive Maintenance Program, and Systems Walkdown Program.

Enhancements to the Bolting Integrity Program include the following:

- Establish an augmented inspection program for high-strength (actual yield strength ≥ 150 ksi) bolts. This augmented program will prescribe the examination requirements of Tables IWB-2500-1 and IWC-2500-1 of ASME Section XI for high-strength bolts in the class 1 and class 2 component supports, respectively.

- The Structures Monitoring, Preventive Maintenance and Systems Walkdown Programs will be enhanced to include requirements to inspect, bolting for indication of loss of preload, cracking and loss of material, as applicable.

- Include in NMP administrative and implementing program documents references to the Bolting Integrity Program and Industry guidance.

Enhancements will be completed prior to the period of extended operation.

A1.1.39 BWR CONTROL ROD DRIVE RETURN LINE (CRDRL) NOZZLE PROGRAM

The NMP Unit 1 Control Rod Drive Return Line (CRDRL) Nozzle Program is an existing program that requires UT inspections of the CRDRL nozzle every 10 years to verify the nozzle is acceptable for continued service. A CRDRL crack growth fracture mechanics analysis was used to demonstrate the adequacy of the 10 year inspection frequency. The crack growth analyses are TLAAs that are managed in accordance with 10 CFR 54.21(c)(1)(iii) as described in Section 4.3.3.

The three exceptions to NUREG-1801, Section XI.M6, are:

1) The NMP Inservice Inspection (ISI) Program does not comply with the specific Edition and Addenda of ASME Section XI cited in the GALL because the program is updated to the latest Edition and Addenda of ASME Section XI, as mandated by 10 CFR 50.55a, prior to the start of each inspection interval;

2) The NMP program uses enhanced ultrasonic inspection techniques instead of PT inspections to satisfy the recommendations of NUREG-0619 (now superseded by Appendix VIII to ASME Section XI, Division 1, 1995 Edition with the 1996 Addenda); and,

3) The NMP program uses an inspection frequency of every 10 years versus every sixth refueling outage or 90 startup/shutdown cycles specified in NUREG-0619.

A1.1.40 PROTECTIVE COATING MONITORING AND MAINTENANCE PROGRAM

The Protective Coating Monitoring and Maintenance Program is an existing program that is described in the NMP1 response to GL 98-04, "Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System after a Loss-Of-Coolant Accident because of Construction and Protective Coating Deficiencies and Foreign Material in Containment." The program applies to Service Level 1 protective coatings inside the primary containment and items within the torus (outside surface of the vent (ring) header and downcomer, inside surface of the vent piping, ring header, vent header junctions, and downcomers). The condition assessments and resulting repair, replacement, or removal activities ensure that the amount of coatings subject to detachment from the substrate during a LOCA is minimized to ensure post-accident operability of the ECCS suction strainers. The Protective Coating Monitoring and Maintenance Program takes exception to certain NUREG-1801, Section XI.S8 (Protective Coating Monitoring and Maintenance Program) evaluation elements, in that it is not credited for prevention of corrosion of carbon steel, the program will be enhanced following the guidance within ASTM D5163-05a, and measurements of cracks, peeling, or delaminated coatings will be estimated via visual methods.

Planned program enhancements include the following:

- Specifying the visual examination of coated surfaces for any visible defects including blistering, cracking, flaking, peeling, and physical or mechanical damage.
- Performance of periodic inspection of coatings every refueling outage versus every 24 months.
- Setting minimum qualifications for inspection personnel, the inspection coordinator, and the inspection results evaluator.
- Performing the thorough visual inspection and areas noted as deficient along with the general visual inspection.
- Specifying the types of instruments and equipment that may be used for the inspection.
- Requiring pre-inspection reviews of the previous two monitoring reports before performing the condition assessment.
- Establishing guidelines for prioritization of repair areas and monitoring these areas until they are repaired.

- Requiring that the inspection results evaluator determine which areas are not acceptable and initiates corrective action.

Enhancements will be completed prior to the period of extended operation.

A1.1.41 NON-EQ ELECTRICAL CABLE METALLIC CONNECTIONS INSPECTION PROGRAM

The Non-EQ Electrical Cable Metallic Connections Inspection Program is a new plant-specific program that manages the aging effects of the metallic portion of electrical cable connections that are not subject to the qualification requirements of 10 CFR 50.49, but are still subject to aging effects caused by various stressors. These aging stressors include: thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation. All connections associated with cables that are in scope for license renewal are part of this program. This program is a condition monitoring program that will require periodic inspection of electrical cable metallic connections to ensure that degraded conditions that would affect the ability of the non-EQ electrical cable metallic connections to perform their intended function are identified and corrected.

Analytical trending will not be included in this program because the parameters monitored may vary depending upon the test method selected. This is an exception to the "Monitoring and Trending" element in Appendix A.1.2.3.5 to NUREG-1800. This program will be implemented prior to the period of extended operation.

A1.2 TIME-LIMITED AGING ANALYSIS SUMMARIES

As part of the application for a renewed license, 10 CFR 54.21(c) requires that an evaluation of Time-Limited Aging Analyses (TLAAs) for the period of extended operation be provided. The following TLAAs have been identified and evaluated to meet this requirement.

A1.2.1 REACTOR VESSEL NEUTRON EMBRITTLEMENT ANALYSIS

The ferritic materials of the reactor vessel are subject to embrittlement due to high energy neutron exposure. The evaluation of reactor vessel neutron embrittlement is a TLAA. The following TLAA discussions are related to the issue of neutron embrittlement:

- Upper Shelf Energy

- Pressure-Temperature (P-T) Limits

- Elimination of Circumferential Weld Inspection
- Axial Weld Failure Probability

A1.2.1.1 UPPER-SHELF ENERGY

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.

The USE for the limiting beltline weld materials for NMP1 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 RPV beltline materials has been projected (reevaluated) for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(ii).

A1.2.1.2 PRESSURE - TEMPERATURE (P – T) LIMITS

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 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 effective full power years (EFPY).

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.

A1.2.1.3 ELIMINATION OF CIRCUMFERENTIAL WELD INSPECTION

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. NMP1 has received relief from reactor vessel circumferential weld examination requirements under GL 98-05, for the remainder of its current 40-year license term (Reference A1.3.1).

Projected values of mean and upper bound reference temperature nil ductility transition temperature (RT_{NDT}) for the limiting circumferential welds at NMP1 are below the bounding mean RT_{NDT} determined by the NRC staff in the SER for BWRVIP-05 (Reference A1.3.7). Thus, there is reasonable assurance the conditional probability of vessel failure due to NMP1 RPV circumferential weld failure is bounded by the NRC analysis.

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.

A1.2.1.4 AXIAL WELD FAILURE PROBABILITY

In the safety evaluation presented in *Supplement to Final Safety Evaluation of the BWR Vessel and Internals Project BWRVIP-05 Report* (Reference A1.3.8), 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. Projected values of mean RT_{NDT} and upper bound RT_{NDT} for the limiting axial welds at NMP1 are below the bounding mean RT_{NDT} value determined by the NRC staff in the SER for BWRVIP-74-A (Reference A1.3.2). 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 NMP1 during the period of extended operation.

Inspection of the axial welds in accordance with the ASME XI code requirements will continue at NMP1 during the period of extended operation. Supporting analyses will be completed prior to the period of extended operation to confirm that the RPV axial weld failure probability for the limiting NMP1 axial weld remains 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.

A1.2.2 METAL FATIGUE ANALYSIS

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).

Designated plant events have been counted and categorized to ensure that the number of actual operational transient cycles does not exceed the number of transients assumed in the plant design for fatigue. 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. 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.

The following thermal and mechanical fatigue analyses of mechanical components have been identified as TLAAs:

- Reactor Vessel Fatigue Analysis
- Feedwater (FWS) Nozzle and Control Rod Drive Return Line (CRDRL) Nozzle Fatigue and Cracking Analyses
- Non-ASME Section III Class 1 Piping and Components Fatigue Analysis

- Reactor Vessel Internals Fatigue Analysis
- Environmentally Assisted Fatigue
- Fatigue of the Emergency Condenser

A1.2.2.1 REACTOR VESSEL FATIGUE ANALYSIS

The original design of RPV pressure boundary components included analyses of fatigue resistance. 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.

For the critical RPV component locations, transients contributing to fatigue usage will be tracked by the Fatigue Monitoring Program (FMP) (Appendix A1.1.16) with additional usage added to the baseline CUF. 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.

A1.2.2.2 FEEDWATER (FWS) NOZZLE AND CONTROL ROD DRIVE RETURN LINE (CRDRL) NOZZLE FATIGUE AND CRACKING ANALYSES

BWRs have experienced fatigue crack initiation and growth in Feedwater System (FWS) and Control Rod Drive Return Line (CRDRL) nozzles. 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. NUREG-0619, *BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking* identifies interim and long-term procedural and design changes to minimize thermal fatigue cracking, as well as inspection requirements.

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 NMP1 FWS nozzles require continued monitoring (including analysis using FatiguePro) to demonstrate compliance over the period of extended operation. Transients contributing to fatigue usage of the FWS nozzles will be tracked by the FMP (Appendix A1.1.16) with additional usage added to the baseline CUF. Additionally, the NMP1 FWS nozzles will be periodically inspected in accordance with NMP1 commitments related to NUREG-0619. 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 to NUREG-0619.

A1.2.2.3 NON-ASME SECTION III CLASS 1 PIPING AND COMPONENTS FATIGUE ANALYSIS

Piping and components WSLR 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. These codes do not require explicit fatigue analyses. 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.

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, Non-ASME Class 1 locations meeting one or more of the following criteria, require development of fatigue analyses (similar to those performed for ASME Class 1 piping):

- The location experiences high fatigue usage due to significant thermal transients due primarily to on/off flow, stratification, and local thermal cycling effects;

- The location experiences high fatigue usage due to structural or material discontinuities that result in high stress indices (e.g., at thickness transitions);

- The location has been identified in NUREG/CR-6260 (Reference A1.3.3) 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 System (piping inside the reactor coolant pressure boundary), 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. For the limiting locations, those transients contributing to fatigue usage will be tracked by the FMP with additional usage added to the baseline CUF.

A1.2.2.4 REACTOR VESSEL INTERNALS FATIGUE ANALYSIS

Determination of CUFs was not a design requirement for reactor vessel internals at NMP1. However, core shroud stabilizer assemblies (tie rods) and mechanical clamps installed as repairs for cracked horizontal and vertical core shroud welds were evaluated for fatigue using ASME Section III methods to calculate alternating stresses and determine CUF values. Fatigue-tolerant design is demonstrated for the tie rods and mechanical clamps with CUFs less than 1.0.

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 (Appendix A1.1.12), which incorporates comprehensive inspection and evaluation guidelines issued by the BWRVIP and approved by the NRC. 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.

A1.2.2.5 ENVIRONMENTALLY ASSISTED FATIGUE

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 A1.3.3) 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.

NMP1 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 as part of the FMP (Appendix A1.1.16). 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.

A1.2.2.6 FATIGUE OF THE EMERGENCY CONDENSER

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 unavailable. The tube and shell sides of the emergency condensers were designed in accordance with ASME Section III Class 2 and 3, respectively. The original tubing has experienced thermal fatigue resulting from leakage past the condensate return valve to the RPV. 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.

While the CUFs were shown to be less than 1.0, certain locations in the NMP1 emergency condensers require continued monitoring (including analysis using FatiguePro) to demonstrate compliance over the period of extended operation. The FMP (Appendix A1.1.16) will track transients specific to the ECS with additional usage added to the baseline CUF for the condensers.

A1.2.3 ENVIRONMENTAL QUALIFICATION (EQ)

The following EQ analysis has been identified as a TLAA:

- Electrical Equipment EQ

A1.2.3.1 ELECTRICAL EQUIPMENT EQ

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.

For components within the scope of the EQ Program (Appendix A1.1.15), 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.

A1.2.4 CONTAINMENT LINER PLATE, METAL CONTAINMENTS, AND PENETRATIONS FATIGUE ANALYSIS

The following containment liner plate, metal containments, and penetrations fatigue analyses have been identified as TLAAs:

- Torus Shell and Vent System Fatigue Analysis
- Torus Attached Piping Analysis
- Torus Wall Thickness

A1.2.4.1 TORUS SHELL AND VENT SYSTEM FATIGUE ANALYSIS

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. NUREG-0661, *Safety Evaluation Report, Mark I Containment Long Term Program, Resolution of Generic Technical Activity A-7*, requires 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.

The 60-year CUF values for the controlling locations in the torus shell are less than 1.0. Therefore, the NMP1 torus shell has been evaluated and is qualified for the period of extended operation.

A1.2.4.2 TORUS ATTACHED PIPING ANALYSIS

As a result of the Mark I Containment Program, modifications were performed at NMP1, including changes to the configuration of safety relief valve (SRV) piping and other piping penetrating the suppression chamber (torus) (generically referred to herein as torus-attached piping). As part of the generic Mark I Containment Program, fatigue analyses were performed considering the design loads identified in NUREG-0661 and its supplements. Fatigue-tolerant design is demonstrated for those locations with CUFs less than 1.0.

The bounding 40-year CUFs for the subject piping and associated penetrations are less than 0.5; therefore, the 60-year CUF values for all controlling locations can be demonstrated to remain less than 1.0. However, SRV actuations, which are the only non-accident or earthquake contributor to torus attached piping fatigue usage, have not been counted historically. SRV actuations for NMP1 to date have been estimated. To ensure that the fatigue usage of the torus attached piping remains within design values, SRV actuations will be added to the Fatigue Monitoring Program (Appendix A1.1.16) as a transient that is monitored. The two torus attached piping locations with the highest calculated fatigue usage will be added to the Fatigue Monitoring Program as locations to be monitored. Therefore, the effects of fatigue on the NMP1 torus attached piping will be adequately managed for the period of extended operation.

A1.2.4.3 TORUS WALL THICKNESS

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. However, subsequent addition of hydrodynamic loads (resulting from LOCA and safety relief valve 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 A1.3.4). Determination of torus corrosion rates is an ongoing activity that considers inspection results and the remaining corrosion allowance.

The NMP1 Torus Corrosion Monitoring Program (Appendix A1.1.36) has been developed to monitor the torus shell material thickness and ensure it is maintained within the bounds of the qualification bases. Therefore, the effects of loss of material on the intended function(s) of the torus shell will be adequately managed during the period of extended operation.

A1.2.4.4 FATIGUE OF PRIMARY CONTAINMENT PENETRATIONS

The NMP1 drywell was designed as a Class B Vessel in accordance with Section III of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, 1965 Edition (ASME Section III, 1965). The 1965 Edition of the ASME Section III B&PV Code did not require fatigue analysis of Class B vessels. The drywell penetrations were considered an extension of the drywell and thus did not require fatigue analysis. For NMP1, fatigue of torus penetrations was addressed in the same analysis as the torus attached piping, the "Plant Unique Analysis Report of the Torus Attached Piping for Nine Mile Point Unit 1 Nuclear Generating Station," which was transmitted to the NRC in a letter dated May 22, 1984. This analysis was performed in accordance with ASME Section III, 1977 Edition, through the Summer 1977 Addenda. Fatigue analyses were performed for the safety/relief valve (SRV) penetration (where the SRV line penetrates the vent header spherical intersection) and torus attached piping penetrations.

The fatigue analyses for the SRV and torus attached piping penetrations considered a number of cycles related to anticipated transients for the original 40-year life of the plant. The number of anticipated significant transient cycles for a 40-year life divided by the maximum number of allowable cycles for the transient producing the maximum stress was used to estimate the 40-year design CUF. Linear projection of this CUF to 60 years results in a CUF far below the allowable.

A1.2.5 OTHER PLANT-SPECIFIC TLAAS

The following Plant-Specific TLAA has been identified for NMP1:

- Reactor Vessel and Reactor Vessel Closure Head Weld Flaw Evaluations

A1.2.5.1 REACTOR VESSEL AND REACTOR VESSEL CLOSURE HEAD WELD FLAW EVALUATIONS

During RFO15, augmented examinations identified unacceptable flaw indications in two RPV shell welds (Reference A1.3.5). During RFO17, UT examinations identified an unacceptable flaw indication in a closure head meridional weld (Reference A1.3.6). 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 based on an assumed number of transient cycles applicable to the original 40-year license term, the subject evaluations satisfy the criteria of 10 CFR 54.3(a).

The number of cycles from the time of inspection to the end of the evaluation period is used to determine crack growth. 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.

Prior to the period of extended operation, the RPV weld flaw evaluation will be revised to consider additional fatigue crack growth and the effects of additional irradiation embrittlement associated with operation for an additional 20 years. The flaws will be reexamined in accordance with ASME Section XI as necessary.

A1.3 REFERENCES

A1.3.1 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).*

A1.3.2 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)".*

A1.3.3 NUREG/CR-6260, INEL-95/0045, *Application of NUREG/CR-5999 Interim Fatigue Curves to Selected Nuclear Power Plant Components, February 1995.*

A1.3.4 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).*

A1.3.5 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.*

A1.3.6 Letter from Nine Mile Point Nuclear Station (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.*

A1.3.7 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).*

A1.3.8 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 Internal Project BWRVIP-05 Report (TAC No. MA3395).*

A1.4 COMMITMENTS

ITEM	COMMITMENT	SOURCE	SCHEDULE
1	Incorporate Appendix A1 into the UFSAR	LRA Section A0	Following the issuance of the renewed Operating License
2	In accordance with 10 CFR 54.21(b), during NRC review of this application, provide 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 (LRA).	LRA Section 1.2.1	December 31, 2005
3	Apply for relief from reactor vessel 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.	LRA Section 4.2.3 and Appendix A1.2.1.3	Prior to Period of Extended Operation
4	Supporting analyses will be completed prior to the period of extended operation to confirm that the failure probabilities for the limiting RPV axial welds remain bounded for the period of extended operation.	LRA Section 4.2.4 and Appendix A1.2.1.4	Prior to Period of Extended Operation
5	For those locations where additional fatigue analysis is required to take advantage of the implicit margin, and to more accurately determine cumulative usage factor (CUFs), the EPRI FatiguePro fatigue monitoring software will be implemented prior to the period of extended operation.	LRA Section 4.3 and Appendices A1.2.2 and B3.2	Prior to Period of Extended Operation
6	For the critical reactor vessel component locations, shown in Table 4.3-3 of the LRA, additional usage will be added to the baseline Cumulative Usage Factor using one of the methods described in Section 4.3 of the LRA.	LRA Section 4.3.1 and Appendix A1.2.2.1	Prior to Period of Extended Operation
7	Transients contributing to fatigue usage of the FWS nozzles will be tracked by the <u>Fatigue Monitoring Program</u> (FMP) with additional usage added to the baseline Cumulative Usage Factor using the Stress Based fatigue method described in Section 4.3 of the LRA.	LRA Section 4.3.3 and Appendix A1.2.2.2	Prior to Period of Extended Operation
8	Develop a baseline Cumulative Usage Factor (CUF) for the specified portions of the following systems: (1) Feedwater / High Pressure Coolant Injection (2) Core Spray (3) Reactor Water Cleanup (piping inside the Reactor Coolant Pressure Boundary) and (4) Reactor Recirculation (and associated Shutdown Cooling Systems Lines). If the baseline CUF for a specified portion of a system exceeds 0.4, the limiting locations may require additional monitoring to demonstrate compliance over the period of extended operation.	LRA Section 4.3.4 and Appendix A1.2.2.3	Prior to Period of Extended Operation

ITEM	COMMITMENT	SOURCE	SCHEDULE
9	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, as part of the Fatigue Monitoring Program. These locations will be evaluated by applying environmental correction factors (F_{en}) to existing and future fatigue analyses.	LRA Section 4.3.6 and Appendices A1.2.2.5 and B3.2	Prior to Period of Extended Operation
10	The Fatigue Monitoring Program will track transients specific to the Emergency Cooling System with additional usage added to the baseline Cumulative Usage Factor for the emergency condensers as described in Section 4.3 of the LRA.	LRA Section 4.3.7, and Appendix A1.2.2.6	Prior to Period of Extended Operation
11	Enhance the Fatigue Monitoring Program to (1) ensure that fatigue usage of the torus attached piping and other torus locations does not exceed the design limits, add ERV lifts as a transient to be counted by the Fatigue Monitoring Program and (2) add the two highest usage torus attached piping locations, the 12-inch core spray suction line for Core Spray Pump 111 that enters the torus at penetration XS-337 and the 3-inch containment spray line that enters the torus at penetration XS-326 as fatigue monitoring locations.	LRA Section 4.6.2 and Appendices A1.2.4.2 and B3.2	Prior to Period of Extended Operation
12	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.	LRA Section 4.7.4 and Appendix A1.2.5.1	Prior to Period of Extended Operation
13	Enhance the BWR VIP to address the following: (1) BWRVIP-18 open item regarding the inspection of inaccessible welds for core spray system. As such, NMPNS will implement the resolution of this open item as documented in the BWRVIP response and reviewed and accepted by the NRC; (2) The inspection and evaluation guidelines for steam dryers are currently under development by the BWRVIP committee. Once these guidelines are documented, and reviewed and accepted by the NRC, the actions will be implemented in accordance with the BWRVIP program; (3) The baseline inspections recommended in BWRVIP-47 for the BWR lower plenum components will be incorporated into the appropriate program and implementing documents; and (4) A schedule for additional inspections of the top guide locations (using EVT 1 or techniques demonstrated to be appropriate in BWRVIP-03) will be incorporated into the appropriate program and implementing documents. A minimum of 10% of the locations will be inspected within 12 years of the beginning of the period of extended operation, with at least 5% of the inspections completed within 6 years.	LRA Appendix B2.1.8	Prior to Period of Extended Operation

ITEM	COMMITMENT	SOURCE	SCHEDULE
14	Enhance the Open Cycle Cooling Water System (OCCWS) Program to (1) Ensure that the applicable commitments made for GL 89-13, and the requirements in NUREG-1801, Section XI.M20 are captured in the implementing documents for GL 89-13; (2) Incorporate into the OCCWS program, the requirements of the NUREG-1801, Section XI.M20 that are more conservative than the GL 89-13 commitments; and (3) Revise the preventive maintenance and heat transfer performance test procedures to incorporate specific inspection criteria, corrective actions, and frequencies.	LRA Appendix B2.1.10	Prior to Period of Extended Operation
15	Enhance the Closed Cycle Cooling Water System (CCCWS) Program to (1) Expand periodic chemistry checks of the systems consistent with the guidelines of EPRI TR-107396;(2) Implement a program to use corrosion inhibitors in the Reactor Building Closed Loop (RBCL) Cooling Systems and Control Room HVAC System in accordance with the guidelines given in EPRI TR-107396; (3) Direct periodic inspections to monitor for loss of material in the piping of the CCCWS; (4) Implement a corrosion monitoring program for larger bore CCCW piping not subject to inspection under another program; (5) Establish the frequencies to inspect for degradation of components in CCCWS, including heat exchanger tube wall thinning; (6) Perform a heat removal capability test for the Control Room HVAC System at least every 5 years; (7) Establish periodic monitoring, trending, and evaluation of performance parameters for the RBCL cooling and Control Room HVAC; (8) Provide the controls and sampling necessary to maintain water chemistry parameters in CCCWS within the guidelines of EPRI Report TR 107396; and (9) Ensure acceptance criteria are specified in the implementing procedures for the applicable indications of degradation.	LRA Appendix B2.1.11	Prior to Period of Extended Operation
16	The Boraflex Monitoring Program will be enhanced to require periodic neutron attenuation testing and measurement of boron areal density to confirm the correlation of the conditions of test coupons to those of Boraflex racks that remain in use during the period of extended operation.	LRA Appendix B2.1.12	Prior to Period of Extended Operation
17	Revise applicable procedures related to the Crane Inspection Program to add specific direction for performance of pre lift corrosion inspections, with acceptance criteria, for certain hoist lifting assembly components.	LRA Appendix B2.1.13	Prior to Period of Extended Operation

ITEM	COMMITMENT	SOURCE	SCHEDULE
18	Enhance the Compressed Monitoring Program to (1) Develop new activities to manage the loss of material, stress corrosion cracking, and perform periodic system leak checks;(2) Expand the scope, periodicity, and inspection techniques to ensure that the aging of certain sub-components of the dryers and compressors (e.g., valves, heat exchangers) are managed; (3) Develop and implement activities to address the failure mechanism of stress corrosion cracking in unannealed red brass piping; (4) Establish activities that manage the aging of the internal surfaces of carbon steel piping and that require system leak checks to detect deterioration of the pressure boundaries; and (5) Expand the acceptance criteria to ensure that the aging of certain sub-components of the dryers and compressors (e.g., valves, heat exchangers) are managed.	LRA Appendix B2.1.14	Prior to Period of Extended Operation
19	Enhance the Fire Protection Program to (1) Incorporate periodic visual inspections of piping and fittings located in a non-water environment such as Halon and Carbon Dioxide fire suppression systems components, to detect evidence of corrosion and any system mechanical damage that could affect its intended function; (2) Expand the scope of periodic functional tests of the diesel-driven fire pump to include inspection of engine exhaust system components to verify that loss of material is managed; and (3) Perform an engineering evaluation to determine the plant specific inspection periodicity of fire doors.	LRA Appendix B2.1.16	Prior to Period of Extended Operation
20	Enhance the Fire Water System Program by revising applicable existing procedures to (1) incorporate inspections to detect and manage loss of material due to corrosion into existing periodic test procedures; (2) specify periodic component inspections to verify that loss of material is being managed; (3) add procedural guidance for performing visual inspections to monitor internal corrosion and detect biofouling; (4) add requirements to periodically check the water-based fire protection systems for microbiological contamination; (5) measure fire protection system piping wall thickness using non-intrusive techniques (e.g., volumetric testing) to detect loss of material due to corrosion; (6) establish an appropriate means of recording, evaluating, reviewing, and trending the results of visual inspections and volumetric testing; and (7) define acceptance criteria for visual inspections and volumetric testing.	LRA Appendix B2.1.17	Prior to Period of Extended Operation

ITEM	COMMITMENT	SOURCE	SCHEDULE
21	Enhance the Fuel Oil Chemistry Program to (1) Incorporate periodic tests for microbiological organisms (2) Provide guidelines for the appropriate use of biocides, corrosion inhibitors, and/or fuel stabilizers to maintain fuel oil quality (3) Add requirements to periodically inspect the interior surfaces of the emergency diesel fuel oil tanks and diesel fire pump fuel oil day tank for evidence of significant degradation, including a specific requirement that the tank bottom thickness be determined (4) Add a requirement for quarterly trending of particulate contamination analysis results and (5) Ensure acceptance criteria are specified in the implementing procedures for the applicable indications of potential degradation.	LRA Appendix B2.1.18	Prior to Period of Extended Operation
22	Enhance the Reactor Vessel Surveillance program to (1) Incorporate the requirements and elements of the Integrated Surveillance Program (ISP), as documented in BWRVIP-116 and approved by NRC, or an NRC approved plant-specific program into the Reactor Vessel Surveillance Program, and include a requirement that if NMPNS surveillance capsules are tested, the tested specimens will be stored in lieu of optional disposal. When the NRC issues a final safety evaluation report (SER) for BWRVIP-116, NMPNS will address any open items and complete the SER Action Items. Should BWRVIP-116 not be approved by the NRC, a plant specific reactor vessel surveillance program will be submitted to the NRC two years prior to commencement of the period of extended operation and (2) Project analyses of upper shelf energy and pressure temperature limits to 60 years using methods prescribed by Regulatory Guide 1.99, Revision 2, and include the applicable bounds of the data, such as operating temperature and neutron fluence.	LRA Appendix B2.1.19	August 22, 2007
23	Develop and implement a One-Time Inspection Program, which also includes the attributes for a Selective Leaching of Materials Program.	LRA Appendices B2.1.20 and 2.1.21	Prior to Period of Extended Operation
24	Develop and implement a Buried Piping and Tank Inspection Program which includes a requirement that if an opportunistic inspection does not occur within the first ten years of extended operation, NMPNS will excavate a representative sample for the purpose of inspection.	LRA Appendix B2.1.22	Prior to Period of Extended Operation
25	An augmented VT-1 visual examination of the containment penetration bellows will be performed using enhanced techniques qualified for detecting SCC, per NUREG-1611, Table 2, Item 12.	LRA Appendix B2.1.23	Prior to Period of Extended Operation

ITEM	COMMITMENT	SOURCE	SCHEDULE
26	Enhance the Structures Monitoring Program to (1) Expand the program to include the following activities or components in the scope of License Renewal but not within the current scope of 10 CFR 50.65: (a) the steel electrical transmission towers required for the SBO and recovery paths; (2) Expand the parameters monitored during structural inspections to include those relevant to aging effects identified for structural bolting; and (3) Implement regularly scheduled ground water monitoring to ensure that a benign environment is maintained.	LRA Appendix B2.1.28	Prior to Period of Extended Operation
27	Develop and implement a Non-EQ Electrical Cables and Connection Program.	LRA Appendix B2.1.29	Prior to Period of Extended Operation
28	Enhance the Non-EQ Electrical Cable and Connections Used in Instrumentation Circuit Program to (1) Implement reviews of calibration or surveillance data for indications of aging degradation affecting instrument circuit performance. The first reviews will be completed prior to the period of extended operation and every ten years thereafter; and (2) In cases where a calibration or surveillance program does not include the cabling system in the testing circuit, or as an alternative to the review of calibration results described above, provide requirements and procedures to perform cable testing to detect deterioration of the insulation system, such as insulation resistance tests or other testing judged to be effective in determining cable insulation condition. The first test will be completed prior to the period of extended operation. The test frequency of these cables shall be determined based on engineering evaluation not to exceed every 10 years.	LRA Appendix B2.1.30	Prior to Period of Extended Operation
29	Enhance the Preventive Maintenance Program to (1) Expand the PM Program to encompass activities for certain additional components, identified as requiring Aging Management. Explicitly define the aging management attributes, including the systems and the component types/commodities included in the program; (2) specifically list those activities credited for aging management; (3) specifically list parameters monitored (4) specifically list the aging effects detected; (5) establish a requirement that inspection data be monitored and trended; and (6) establish detailed parameter-specific acceptance criteria.	LRA Appendix B2.1.32	Prior to Period of Extended Operation
30	Enhance the System Walkdown Program to (1) Train all personnel performing inspections in the Systems Walk-down Program to ensure that age related degradation is properly identified and incorporate this training into the site training program; and (2) Specify acceptance criteria for visual inspections to ensure aging related degradation is properly identified and corrected.	LRA Appendix B2.1.33	Prior to Period of Extended Operation

ITEM	COMMITMENT	SOURCE	SCHEDULE
31	Enhance the Non-Segregated Bus Inspection Program to expand visual inspections of the bus ducts, their supports and insulation systems. Also, new provisions will be made to perform either periodic low range resistance checks of the bus ducts or torque checks of a statistical sample of accessible bolted connections.	LRA Appendix B2.1.34	Prior to Period of Extended Operation
32	Develop and implement a Fuse Holder Inspection Program.	LRA Appendix B2.1.35	Prior to Period of Extended Operation
33	Enhance the Bolting Integrity Program to (1) The Structures Monitoring, Preventive Maintenance and Systems Walk-down Programs will be enhanced to include requirements to inspect bolting for indication of loss of preload, cracking, and loss of material, as applicable; (2) Include in NMP administrative and implementing program documents references to the Bolting Integrity Program and Industry guidance; and (3) Establish an augmented inspection program for high-strength (actual yield strength ≥ 150 ksi) bolts. This augmented program will prescribe the examination requirements of Tables IWB-2500-1 and IWC-2500-1 of ASME Section SI for high-strength bolts in the Class 1 and Class 2 component supports, respectively.	LRA Appendix B2.1.36	Prior to Period of Extended Operation
34	Enhance the Protective Coating Monitoring and Maintenance Program to (1) specify the visual examination of coated surfaces for any visible defects includes blistering, cracking, flaking, peeling, and physical or mechanical damage; (2) perform periodic inspection of coatings every refueling outage versus every 24 months; (3) set minimum qualifications for inspection personnel, the inspection coordinator, and the inspection results evaluator; (4) perform thorough visual inspections in areas noted as deficient concurrently with the general visual inspection; (5) specify the types of instruments and equipment that may be used for the inspection; (6) pre-inspection reviews of the previous two monitoring reports before performing the condition assessment; (7) establishment of guidelines for prioritization of repair areas and monitoring these areas until they are repaired; and (8) to require that the inspection results evaluator determine which areas are unacceptable and initiate corrective action.	LRA Appendix B2.1.38	Prior to Period of Extended Operation
35	Develop and implement a Non-EQ Electrical Cable Metallic Connections Inspection Program.	LRA Appendix B2.1.39	Prior to Period of Extended Operation
36	Follow the status of the proposed ASME Code change with respect to allowing roll / expansion techniques for Control Rod Drive (CRD) stub tubes. Implement final code change or provide alternative plan for period of extend operation at least 1 year prior to expiration of current Operating License.	LRA Appendix B2.1.8	August 22, 2008

ITEM	COMMITMENT	SOURCE	SCHEDULE
37	Maintenance procedure for inspection of the Orificed Fuel Support casting will be enhanced to include a sample VT-1 inspection of the casting and EVT-1 inspection if any evidence of impact or mishandling is identified.	LRA Appendix B2.1.8	Prior to Period of Extended Operation

A1.5 GENERIC QUALITY ASSURANCE PROGRAM REQUIREMENT FOR LICENSE RENEWAL

The NMP Quality Assurance Program implements the requirements of 10 CFR 50, Appendix B, and is consistent with the summary in Appendix A.2 of NUREG-1800, "Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants," published July 2001. The elements of corrective action, confirmation process, and administrative controls in the Quality Assurance Program are applicable to both safety-related and non-safety related systems, structures, and components that are subject to an aging management review. Generically, these three elements are applicable as follows:

Corrective Actions

Corrective actions are implemented in accordance with the requirements of 10 CFR 50, Appendix B, as committed in the NMP1 UFSAR, Appendix B. The NMP corrective action program provides for the identification, evaluation, and resolution of non-conforming conditions.

Confirmation Process

The confirmation process is part of the corrective action program, which is implemented in accordance with the requirements of 10 CFR 50, Appendix B, as committed in the NMP1 UFSAR, Appendix B. The focus of the confirmation process is on the verification that corrective actions are effective. The measure of effectiveness is in terms of correcting the adverse condition and precluding repetition of significant conditions adverse to quality.

Administrative Controls

Aging management programs are implemented through various plant documents. These implementing documents are subject to administrative controls, including a formal review and approval process, in accordance with the requirements of 10 CFR 50, Appendix B, as committed in the NMP1 UFSAR, Appendix B.

A2 APPENDIX A2 – NMP2 UPDATED SAFETY ANALYSIS REPORT (USAR) SUPPLEMENT

A2.1 AGING MANAGEMENT PROGRAMS

A2.1.1 10 CFR 50 APPENDIX J PROGRAM

The 10 CFR 50 Appendix J Program detects degradation of the containment structure and components that comprise the containment pressure boundary, including seals and gaskets. Containment leak rate tests are performed to assure that leakage through the primary containment and systems and components penetrating primary containment does not exceed allowable leakage limits specified in the Technical Specifications. This program complies with Option B requirements of 10 CFR 50 Appendix J with plant-specific exceptions approved by the NRC as part of license amendments, and implements the guidelines provided in NRC Regulatory Guide (RG) 1.163 and NEI 94-01.

A2.1.2 ASME SECTION XI INSERVICE INSPECTION (SUBSECTION IWE) PROGRAM

The American Society of Mechanical Engineers (ASME) Section XI Inservice Inspection (Subsection IWE) Program (referred to herein as the IWE ISI Program) manages aging effects due to (1) corrosion of carbon steel components comprising the containment pressure boundary; and (2) degradation of containment pressure-retaining polymers. Program activities include visual examination, with limited surface or volumetric examinations when augmented examination is required. The IWE ISI Program is based on the 1998 edition of the ASME Boiler and Pressure Vessel Code, Section XI (Subsection IWE) for containment inservice inspection with plant-specific exceptions approved by the NRC. This is an exception to the evaluation in NUREG-1801 (which covers ASME Section XI requirements from both the 1992 edition with the 1992 addenda and the 1995 edition with the 1996 addenda).

The NMP2 ASME Section XI Inservice Inspection (Subsection IWE) Program is being enhanced to add an augmented VT-1 visual examination of the NMP2 containment penetration bellows. This inspection will be performed using enhanced techniques qualified for detecting SCC per NUREG-1611, Table 2, Item 12.

A2.1.3 ASME SECTION XI INSERVICE INSPECTION (SUBSECTION IWF) PROGRAM

The ASME Section XI Inservice Inspection (Subsection IWF) Program (referred to herein as the IWF ISI Program) manages aging of carbon steel component and piping supports, including ASME Class MC supports, due to general corrosion and wear. Program activities include visual examination determine the general mechanical and structural condition of components and their supports. The IWF ISI Program is based on the 1989 edition of the ASME Boiler and Pressure Vessel Code, Section XI (Subsection IWF) for inservice inspection of supports and implements the alternate examination requirements of ASME Code Case N-491-1. This is an exception to the evaluation in NUREG-1801 (which covers ASME Section XI requirements from the 1989 edition through the 1995 edition and addenda through the 1996 addenda).

A2.1.4 ASME SECTION XI INSERVICE INSPECTION (SUBSECTION IWL) PROGRAM

The ASME Section XI Inservice Inspection (Subsection IWL) Program (referred to herein as the IWL ISI Program) manages aging of concrete in the NMP2 containment wall, base mat, and drywell floor. Program activities include general visual examination of all accessible concrete surface areas, with provisions for detailed visual examination when deterioration and distress of suspect areas is detected. The IWL ISI Program is based on the 1998 edition of the ASME Boiler and Pressure Vessel Code, Section XI (Subsection IWL) for containment inservice inspection with plant-specific exceptions approved by the NRC. This is an exception to the evaluation in NUREG-1801 (which covers ASME Section XI requirements from both the 1992 edition with the 1992 addenda and the 1995 edition with the 1996 addenda).

A2.1.5 ASME SECTION XI INSERVICE INSPECTION (SUBSECTIONS IWB, IWC, IWD) PROGRAM

The ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program manages aging of Class 1, 2, or 3 pressure-retaining components and their integral attachments. Program activities include periodic visual, surface, and/or volumetric examination and pressure tests of Class 1, 2 and 3 pressure-retaining components. The ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program is based on ASME Section XI, 1989 edition, with no Addenda and ASME Section XI, Appendix VIII, 1995 Edition through 1996 Addenda. Examination categories B-F, B-J, C-F-1, C-F-2 and IGSCC Category A are inspected using the EPRI risk-informed methodology and implemented in accordance with ASME Code Case N-578-1 as approved by NRC plant-specific Relief Request This is an exception to the program described in NUREG-1801 (which cites ASME Section XI requirements covered in the 1995 edition through 1996 addenda).

A2.1.6 DELETED

A2.1.7 BURIED PIPING AND TANKS INSPECTION PROGRAM

The Buried Piping and Tanks Inspection Program is a new program that will manage the aging effects on the external surfaces of carbon steel, low-alloy steel, and cast iron components (e.g. tanks, piping) that are buried in soil. Program activities will include visual inspections of external coatings and wrappings to detect damage and degradation. Periodicity of inspections will be based on plant operating experience and opportunities for inspection due to maintenance. If an opportunistic inspection does not occur within the first ten years of extended operation, NMPNS will excavate a representative sample for the purpose of inspection. This program will be implemented prior to the period of extended operation.

A2.1.8 BWR FEEDWATER NOZZLE PROGRAM

The NMP2 Feedwater Nozzle Program is an existing program that requires UT examinations of the feedwater nozzles every 10 years to verify the nozzles are acceptable for continued service.

The Feedwater Nozzle Program is implemented through the Inservice Inspection (ISI) Program which, at the time the license renewal application was submitted, conformed to the requirements in American Society of Mechanical Engineers (ASME) Code, Section XI, Subsection IWB, Table IWB 2500-1 (1989 Edition no Addenda), and ASME Section XI, Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," 1995 Edition with the 1996 Addenda. NUREG-1801, Section XI.M5, identifies the 1995 edition (including the 1996 addenda) of ASME Section XI as the basis for the GALL feedwater nozzle program. The Inservice Inspection (ISI) Programs will not comply with the Edition and Addenda of ASME Section XI cited in the GALL because the programs are updated to the latest Edition and Addenda of ASME Section XI, as mandated by 10 CFR 50.55a, prior to the start of each inspection interval.

UT and PT inspections required by NUREG-0619 have been superseded because the inspections are now performed in accordance with ASME Section XI, Appendix VIII.

A2.1.9 BWR PENETRATIONS PROGRAM

The BWR Penetrations Program manages the effects of cracking in the various penetrations of the reactor pressure vessels at NMPNS. The BWR Penetrations Program is based on guidelines issued by the BWR Vessel and Internals Project (BWRVIP) and approved by the NRC. This program is implemented by the BWR Vessel Internals Program for managing specific aging effects. The attributes of the BWR Penetrations Program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program.

A2.1.10 BWR REACTOR WATER CLEANUP SYSTEM PROGRAM

The BWR Reactor Water Cleanup System Program manages the effects of stress corrosion cracking or intergranular stress corrosion cracking on the intended function of austenitic stainless steel piping in the reactor water cleanup system. This program is based on the NRC criteria related to inspection guidelines for RWCU piping welds outboard of the containment isolation valve as delineated in NUREG-0313, Revision 2, and Generic Letter (GL) 88-01. The design of the NMP2 RWCU system is such that carbon steel piping welds are not required to be examined in accordance with GL 88-01. The attributes of the BWR Reactor Water Cleanup System Program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program.

A2.1.11 BWR STRESS CORROSION CRACKING PROGRAM

The BWR Stress Corrosion Cracking (SCC) Program manages intergranular stress corrosion cracking in reactor coolant pressure boundary piping made of stainless steel as delineated in NUREG-0313, Revision 2, and Generic Letter 88-01 and its Supplement 1, as modified by BWRVIP-75. Augmented inspections are performed in accordance with these documents. An exception to the program described in NUREG-1801 is that the acceptance criteria for the NMP BWR SCC program are based upon the 1989 edition of the ASME Section XI code versus the 1995 edition through the 1996 addenda as described in NUREG-1801. The attributes of the BWR SCC program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program.

A2.1.12 BWR VESSEL ID ATTACHMENT WELDS PROGRAM

The BWR Vessel ID Attachment Welds Program manages the effects of cracking in reactor pressure vessel inside diameter attachment welds. This program is based on industry guidelines issued by the BWRVIP and approved by the NRC. The BWR Vessel ID Attachment Welds Program is implemented by the BWR Vessel Internals Program for managing specific aging effects. The attributes of the BWR Vessel ID Attachment Welds Program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program.

A2.1.13 BWR VESSEL INTERNALS PROGRAM

The BWR Vessel Internals Program manages aging of materials inside the reactor vessel. Program activities include (1) inspections for the presence and effects of cracking; and (2) monitoring and control of water chemistry. This program is based on guidelines issued by the BWRVIP and approved (or pending approval[7]) by the NRC. Inspections and evaluations of reactor vessel components are consistent with the guidelines provided in the following BWRVIP reports:

BWRVIP-18, BWR Core Spray Internals Inspection and Flaw Evaluation Guidelines

BWRVIP-25, BWR Core Plate Inspection and Flaw Evaluation Guidelines

BWRVIP-26, BWR Top Guide Inspection and Flaw Evaluation Guidelines

BWRVIP-27, BWR Standby Liquid Control System/Core Plate ΔP Inspection and Flaw Evaluation Guidelines

BWRVIP-38, BWR Shroud Support Inspection and Flaw Evaluation Guidelines

BWRVIP-41, BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines

BWRVIP-42, LPCI Coupling Inspection and Flaw Evaluation Guidelines

BWRVIP-47, BWR Lower Plenum Inspection and Flaw Evaluation Guidelines

BWRVIP-48, Vessel ID Attachment Weld Inspection and Flaw Evaluation Guidelines

BWRVIP-49, Instrument Penetration Inspection and Flaw Evaluation Guidelines

BWRVIP-74, BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines

[7] NRC review of BWRVIP-76 is not yet complete.

BWRVIP-76, BWR Core Shroud Inspection and Flaw Evaluation Guidelines

NMP2 has completed, or will complete, each of the license renewal applicant action items described in the NRC safety evaluations for these BWRVIP reports. In addition, NMP2 will implement the NRC approved inspection and flaw evaluation guidelines for the steam dryer, access hole cover, and inaccessible core spray, jet pump, and LPCI component welds when issued. The attributes of the BWR Vessel Internals Program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program.

Enhancements to the BWR Vessel Internals Program include the following revisions to existing activities that are credited for license renewal:

- A schedule for additional inspections of the top guide locations (using EVT-1 or techniques demonstrated to be appropriate in BWRVIP-03) will be implemented. A minimum of 10% of the locations will be inspected within 12 years of the beginning of the period of extended operation, with at least 5% of the inspections completed within 6 years.
- NMPNS will implement the resolution of the open items documented in BWRVIP-18, BWRVIP-41, and BWRVIP-42 regarding the inspection of inaccessible welds for core spray, jet pump, and low pressure coolant injection (LPCI) components, respectively. It will be included in the BWRVIP response to be reviewed and accepted by the NRC.
- Once the guidelines for inspection and evaluation for steam dryers currently under development by the BWRVIP committee are documented, reviewed and accepted by the NRC, the actions will be implemented in accordance with the BWRVIP program.
- Once the inspection and evaluation guidelines for access hole covers guidelines are documented, reviewed and accepted by the NRC, the actions will be implemented into the BWRVIP program.
- The baseline inspections recommended in BWRVIP-47 for the BWR lower plenum components will be incorporated into the program.
- Maintenance procedures for the inspection of the Orificed Fuel Support (OFS) casting will be enhanced to include a sample VT-1 inspection of the casting and an EVT-1 inspection if any evidence of impact or mishandling is identified.

Enhancements will be completed prior to the period of extended operation.

A2.1.14 CLOSED-CYCLE COOLING WATER SYSTEM PROGRAM

The Closed-Cycle Cooling Water System (CCCWS) Program manages loss of material and fouling of components exposed to closed-cycle cooling water environments. The applicable piping systems include the Reactor Building Closed Loop Cooling System which does not perform an intended cooling function, Control Building Ventilation Chilled Water System, the heat exchanger jacket water cooling portion of the Standby Diesel Generator Protection (Generator) System. Also included are portions of non-safety related systems credited in the aging management review. Program activities include chemistry monitoring, surveillance testing, data trending, and component inspections. The CCCWS Program implements the guidelines for controlling system performance and aging effects described in Electric Power Research Institute (EPRI) Report TR-107396.

Enhancements to the CCCWS Program include the following revisions to existing activities that are credited for license renewal:

- Direct periodic inspections to monitor for loss of material in the piping of the CCCW systems.
- Establish periodic monitoring, trending, and evaluation of performance parameters for the Reactor Building Closed Loop Cooling and Control Building Ventilation Chilled Water Systems.
- Implement a program to use corrosion inhibitors in the Reactor Building Closed Loop Cooling System and Control Building Ventilation Chilled Water System in accordance with the guidelines given in EPRI TR-107396.
- Establish the frequencies to inspect for degradation of components in CCCW Systems, including heat exchanger tube wall thinning.
- Expand periodic chemistry checks of CCCW Systems consistent with the guidelines of EPRI TR-107396.
- Specify chemistry sampling frequency for the Control Building Ventilation Chilled Water System.
- Provide the controls and sampling necessary to maintain water chemistry parameters in CCCW Systems within the guidelines of EPRI Report TR-107396.

- Ensure acceptance criteria are specified in the implementing procedures for the applicable indications of degradation.

The enhancements will be completed prior to the period of extended operation.

A2.1.15 ENVIRONMENTAL QUALIFICATION PROGRAM

The Environmental Qualification (EQ) Program manages thermal, radiation, and cyclical aging for electrical equipment important to safety and active safety-related mechanical equipment located in harsh plant environments at NMPNS. Program activities (1) identify applicable equipment and environmental requirements; (2) establish, demonstrate, and document the level of qualification (including configuration, maintenance, surveillance, and replacement requirements); and (3) maintain (or preserve) qualification. The EQ Program employs aging evaluations based on 10 CFR 50.49(f) qualification methods. Components in the EQ Program must be refurbished, replaced, or have their qualification extended prior to reaching the aging limits established in the evaluation.

A2.1.16 FATIGUE MONITORING PROGRAM

The Fatigue Monitoring Program (FMP) is an existing program that manages the fatigue life of reactor coolant pressure boundary components by tracking and evaluating key plant events. The FMP monitors operating transients to date, calculates cumulative usage factors to date, and directs performance of engineering evaluations to develop preventive and mitigative measures in order not to exceed the design limit on fatigue usage.

The FMP will be enhanced with guidance for the use of the FatiguePro software package and updated methodology for environmental fatigue factors in establishing updated fatigue life calculations for components. The enhancement will be completed prior to the period of extended operation.

A2.1.17 FIRE PROTECTION PROGRAM

The Fire Protection Program provides guidance for performance of periodic visual inspections to manage aging of the various materials comprising rated fire barriers. These include (a) sealants in rated penetration seals (subject to shrinkage due to weathering); (b) concrete and steel in fire rated walls, ceilings, and floors (subject to loss of material due to flaking and abrasion; separation and concrete damage due to relative motion, vibration, and shrinkage); and (c) steel in rated fire doors (subject to loss of material due to corrosion and wear or mechanical damage). In addition this program requires testing of the diesel-driven fire pump to verify that it is performing its intended function. This activity manages aging of the fuel oil supply line to and the exhaust system from the diesel engine, both of which may experience loss of material due to corrosion. Inspection and testing is performed in accordance with the guidance of applicable standards.

NMP takes two exceptions to the Fire Protection Program as described in NUREG-1801. NMP will perform inspections on hollow metal fire doors on a plant specifc schedule and will not use valve lineups for aging management of fire suppression systems. These exceptions are consistent with ISG-04.

The Fire Protection Program will be enhanced to include periodic visual inspections of piping and fittings in a non-water environment in the Halon and Carbon Dioxide fire suppression systems components to detect signs of degradation. Additionally, periodic functional tests of the diesel-driven fire pump will be enhanced to include inspection of engine exhaust system components to verify that loss of material is managed. Finally, the fire door inspection frequency will be determined by a plant specific analysis. These enhancements will be implemented prior to the period of extended operation.

A2.1.18 FIRE WATER SYSTEM PROGRAM

The Fire Water System Program manages aging of water-based fire protection systems due to loss of material and biofouling. Program activities include periodic maintenance, testing, and inspection of system piping and components containing water (e.g., sprinklers, nozzles, fittings, valves, hydrants, hose stations, standpipes). Inspection and testing is performed in accordance with the guidance of applicable National Fire Protection Association (NFPA) Codes and Standards and the Nuclear Electric Insurance Limited (NEIL) Members' Manual.

Enhancements to the Fire Water System Program include the following revisions to existing activities that are credited for license renewal:

- Incorporate inspections to detect and manage loss of material due to corrosion into existing periodic test procedures.
- Specify periodic component inspections to verify that loss of material is being managed.
- Add procedural guidance for performing visual inspections to monitor internal corrosion and detect biofouling.
- Add requirements to periodically check the water-based fire protection systems for microbiological contamination.

- Measure fire protection system piping wall thickness using non-intrusive techniques (e.g., volumetric testing) to detect loss of material due to corrosion.
- Establish an appropriate means of recording, evaluating, reviewing, and trending the results of visual inspections and volumetric testing.
- Define acceptance criteria for visual inspections and volumetric testing.

Enhancements will be completed prior to the period of extended operation.

A2.1.19 FLOW-ACCELERATED CORROSION PROGRAM

The Flow-Accelerated Corrosion (FAC) Program (also referred to as the Erosion/Corrosion Program) manages aging effects due to flow-accelerated corrosion in carbon steel and low alloy steel piping containing single-phase and two-phase high-energy fluids. Program activities include (1) analysis using a predictive code (CHECWORKS) to determine critical locations, (2) baseline inspections to determine the extent of thinning at the selected locations, (3) follow-up inspections to confirm the predictions, and (4) repair or replacement of components, as necessary. The program considers the recommended actions in NRC Bulletin 87-01 and Information Notice 91-18, and implements the guidelines for an effective FAC program presented in EPRI Report NSAC-202L-R2. The program also implements the recommendations provided in NRC Generic Letter 89-08, *Erosion/Corrosion Induced Pipe Wall Thinning.*

A2.1.20 FUEL OIL CHEMISTRY PROGRAM

The Fuel Oil Chemistry Program manages loss of material due to corrosion that may result from introduction of contaminants into the plant's fuel oil tanks. Program activities include (1) sampling and chemical analysis of the fuel oil inventory at the plant, (2) sampling, testing, and analysis of new fuel oil as it is unloaded at the plant, and (3) cleaning and inspection of fuel oil tanks. The Fuel Oil Chemistry Program is based on maintaining fuel oil quality in accordance with the guidelines of American Society for Testing Materials (ASTM) Standards D975, D1796, D2276, and D4057.

The Fuel Oil Chemistry Program takes exceptions to NUREG-1801, Section XI.M30 (Fuel Oil Chemistry Program) evaluation elements.

- NMP 2 takes exception to using both ASTM D 1796 and ASTM D 2709 to determine the concentration of water and sediment in the diesel fuel oil tanks. NMP 2 uses only the guidance given in ASTM D 1796.

- NMP 2 takes exception to using the *modified* ASTM D 2276, Method A which specifies a pore size of 3.0 μm. NMP 2 uses a filter with a pore size of 0.8 μm as specified in ASTM D 2276.

- NMP 2 takes exception to multilevel sampling in the diesel fuel oil tanks. The physical configuration of the fuel oil tanks does not allow a representative fuel oil sample to be taken at multiple levels.

- NMP 2 takes exception to periodically sampling the emergency diesel fuel oil day tanks. These small tanks do not have a provision for sampling.

Enhancements to the Fuel Oil Chemistry Program include the following revisions to existing activities that are credited for license renewal:

- Add a requirement for quarterly trending of particulate contamination analysis results.

- Add requirements to periodically inspect the fuel oil tanks for evidence of significant degradation, including a requirement that the tank thickness be determined.

- Provide guidelines for the appropriate use of biocides, corrosion inhibitors, and fuel stabilizers to maintain fuel oil quality.

- Add a requirement to sample the diesel fuel oil storage tanks for water and sediment at least quarterly per the ASTM standard.

- Ensure acceptance criteria are specified in the implementing procedures for the applicable indications of potential degradation.

Enhancements will be completed prior to the period of extended operation.

A2.1.21 FUSE HOLDER INSPECTION PROGRAM

The Fuse Holder Inspection Program is a new plant-specific program that applies to fuse holders located outside of active devices that have aging effects requiring management. This program requires testing to detect deterioration of metallic clamps that would affect the ability of in-scope fuse holders to perform their intended function. The Fuse Holder Inspection Program includes the following aging stressors: moisture, fatigue, ohmic heating, mechanical stress, vibration, thermal cycling, electrical transients, chemical contamination, oxidation, and corrosion.

Analytical trending will not be included in this activity because the parameters monitored may vary depending upon the test method selected. This is an exception to the "Monitoring and Trending" element in Appendix A.1.2.3.5 to NUREG-1800, but is consistent with the latest regulatory and industry License Renewal precedence. This program will be implemented prior to the period of extended operation.

A2.1.22 INSPECTION OF OVERHEAD HEAVY LOAD AND LIGHT LOAD HANDLING SYSTEMS PROGRAM

The Inspection of Overhead Heavy Load and Light Load Handling Systems Program (referred to herein as the Crane Inspection Program) manages loss of material due to corrosion of cranes within scope of license renewal (WSLR). Program activities include (1) performance of various maintenance activities on a specified frequency; and (2) pre-operational inspections of equipment prior to lifting activities. Crane inspection activities are based on the mandatory requirements of applicable industry standards and implement the guidance of NUREG-0612.

The Crane Inspection Program will be enhanced to add specific direction for performance of pre-lift corrosion inspections of certain hoist lifting assembly components. The enhancement will be completed prior to the period of extended operation.

A2.1.23 MASONRY WALL PROGRAM

The Masonry Wall Program manages aging effects so that the evaluation basis established for each masonry wall WSLR remains valid through the period of extended operation. The Masonry Wall Program is based on the structures monitoring requirements of 10 CFR 50.65. The Masonry Wall Program is implemented by the Structures Monitoring Program for managing specific aging effects.

A2.1.24 NON-EQ ELECTRICAL CABLES AND CONNECTIONS PROGRAM

The Non-EQ Electrical Cables and Connections Program is a new program that manages aging of cables and connectors WSLR exposed to adverse localized temperature, moisture, or radiation environments. Program activities include periodic visual inspection of susceptible cables for evidence of cable and connection jacket surface anomalies. This program will be implemented prior to the period of extended operation.

A2.1.25 NON-EQ ELECTRICAL CABLES AND CONNECTIONS USED IN INSTRUMENTATION CIRCUITS PROGRAM

The Non-EQ Electrical Cables Used in Instrumentation Circuits Program manages aging of cables and connections exposed to adverse localized temperature and radiation environments that could result in loss of insulation resistance. It applies to accessible and inaccessible electrical cables that are not in the EQ Program and are used in circuits with sensitive, high-voltage, low-level signals such as radiation monitoring, nuclear instrumentation, and other such cables subject to aging management review that are sensitive to a reduction in insulation resistance . Activities include routine calibration tests of instrumentation loops or direct testing of the cable system in those cases where cable testing is conducted as an alternate to surveillance testing, and in either case are implemented through the Surveillance Testing and Preventive Maintenance Programs. Testing is based on requirements of the particular calibrations, surveillances or testing performed on the specific instrumentation circuit or cable and is implemented through the work control system. Where cable testing is conducted as an alternate to surveillance testing the acceptance criteria for each test will be defined by the specific type of test performed and the specific cable tested.

Enhancements to the Non-EQ Electrical Cables Used in Instrumentation Circuits Program include the following revisions to existing activities that are credited for license renewal:

- Implement reviews of calibration or surveillance data for indications of aging degradation affecting instrument circuit performance. The first reviews will be completed prior to the period of extended operation and every ten years thereafter.

- In cases where a calibration or surveillance program does not include the cabling system in the testing circuit, or as an alternative to the review of calibration results described above, provide requirements and procedures to perform cable testing to detect deterioration of the insulation system, such as insulation resistance tests or other testing judged to be effective in determining cable insulation condition. The first test will be completed prior to the period of extended operation. The test frequency of these cables shall be determined based on engineering evaluation not to exceed every 10 years.

Enhancements will be completed prior to the period of extended operation.

A2.1.26 DELETED

A2.1.27 NON-SEGREGATED BUS INSPECTION PROGRAM

The Non-Segregated Bus Inspection Program is an existing plant-specific program that manages aging effects for components and materials internal to the non-segregated bus ducts that connect the reserve auxiliary transformers to the 4160V buses required for the recovery of offsite power following a Station Blackout (SBO) event. Based upon the most recent industry and regulatory license renewal precedence, this program also includes normally energized bus ducts associated with boards feeding components WSLR. These normally-energized components are not subject to the environmental qualification requirements of 10 CFR 50.49, but can be affected by elevated temperatures prior to the end of the period of extended operation. Program activities include visual inspections of internal portions of the bus ducts to detect cracks, corrosion, debris, dust, and moisture; visual inspections of the bus insulating system to detect embrittlement, cracking, melting, swelling, and discoloration; visual inspections of bus supports (insulators) to detect cracking and lack of structural integrity; and a torque test or a resistance test of a sample of accessible bolted connections. The program considers the technical information and guidance provided in applicable industry publications.

Analytical trending will not be included in this activity because the ability to trend inspection results is limited. This is an exception to the "Monitoring and Trending" element in Appendix A.1.2.3.5 to NUREG-1800.

Enhancements to the Non-Segregated Bus Inspection Program include expanded visual inspections of the bus ducts, their supports and insulation systems, as well as the performance of low range resistance checks of the bus ducts or torque checks from a statistical sample of accessible bolted connections.

Enhancements will be implemented prior to the period of extended operation.

A2.1.28 ONE-TIME INSPECTION PROGRAM

The One-Time Inspection Program is a new program that manages aging effects with potentially long incubation periods for susceptible components WSLR. Program activities include visual, volumetric, and other established inspection techniques consistent with industry practice to provide a means of verifying that an aging effect is either (1) not occurring, or (2) progressing so slowly that it has a negligible effect on the intended function of the structure or component. The program also provides measures for verifying the effectiveness of existing aging management programs. This program is a new program that will be implemented prior to the period of extended operation.

A2.1.29 OPEN-CYCLE COOLING WATER SYSTEM PROGRAM

The Open-Cycle Cooling Water System (OCCWS) Program manages aging of components exposed to raw, untreated (e.g., service) water. This includes a portion of the Alternate Decay Heat (ADH) system associated portions of the Service Water (SWP) system the Residual Heat Removal (RHS) heat exchangers, Diesel Generator (EGS) jacket water coolers, and Control Room Chillers (HVK). Also included are components WSLR that are wetted by the SW system and credited in the aging management review. Program activities include (a) surveillance and control of biofouling (including biocide injection), (b) verification of heat transfer capabilities for components cooled by the Service Water System, (c) inspection and maintenance, (d) walkdown inspections, and (e) review of maintenance, operating and training practices and procedures. Inspections may include visual, Ultrasonic Testing (UT), and Eddy Current Testing (ECT) methods. This program is based on the recommendations of Generic Letter (GL) 89-13.

Enhancements to the Open Cycle Cooling Water System Program include the following activities that are credited for license renewal:

- Ensure that the applicable NMP 2 commitments made for GL 89-13, and the requirements in NUREG-1801, Section XI.M20 are captured in N2-TDP-REL-0104, "GL 89-13, Service Water System Problems Affecting Safety Related Equipment Program Plan."

- Where the requirements of the NUREG-1801, Section XI.M20 are more conservative than the GL 89-13 commitments, they will be incorporated into the OCCWS program.

- Revise NMP 2 preventive maintenance and heat transfer performance test procedures to incorporate specific inspection criteria, corrective actions, and frequencies.

Enhancements will be completed prior to the period of extended operation.

A2.1.30 PREVENTIVE MAINTENANCE PROGRAM

The scope of the Preventive Maintenance (PM) Program includes, but is not limited to, valve bodies, heat exchangers, expansion joints, tanks, ductwork, fan/blower housings, dampers, and pump casings. This program provides for performance of various maintenance activities on a specified frequency based on vendor recommendations and operating experience. These activities provide opportunities for component condition monitoring to manage the effects of aging for many SSCs WSLR.

Enhancements to the PM Program include the following revisions to existing activities that are credited for license renewal:

- Expand the PM Program to encompass activities for certain additional components identified as requiring aging management.
- Explicitly define the aging management attributes, including the systems and the component types/commodities included in the program.
- Specifically list activities credited for aging management, parameters monitored, and the aging effects detected.
- Establish a requirement that inspection data be monitored and trended.
- Establish detailed parameter-specific acceptance criteria.

Enhancements will be completed prior to the period of extended operation.

A2.1.31 REACTOR HEAD CLOSURE STUDS PROGRAM

The Reactor Head Closure Studs Program manages cracking of and loss of material from the reactor pressure vessel closure studs. This program implements the preventive measures of Regulatory Guide 1.65. Inservice examinations are performed in accordance with the 1989 edition of the ASME Boiler and Pressure Vessel Code with no Addenda, and ASME Section XI, Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," 1995 Edition through 1996 Addenda as approved by the NRC in plant-specific exemptions. This is an exception to the program described in NUREG-1801 (which cites ASME Section XI requirements covered in the 1995 edition through 1996 addenda).

A2.1.32 REACTOR VESSEL SURVEILLANCE PROGRAM

The Reactor Vessel Surveillance Program is an existing program that manages loss of fracture toughness due to neutron irradiation embrittlement in the Reactor Pressure Vessel (RPV) beltline material. Program activities include (1) periodic withdrawal and testing of surveillance capsules from the RPV; (2) use of test results and allowable stress loadings for the ferritic RPV materials to determine operating limits; and (3) comparison with a large industry data set to confirm validity of test results. Analysis and testing are based on the requirements of 10 CFR 50, Appendix H, and ASTM Standard E-185. NMPNS committs to implement the Integrated Surveillance Program (ISP) described in BWRVIP-116 (if approved by the NRC staff). When the NRC issues a final safety evaluation report (SER) for BWRVIP-116, NMPNS will address any open items and complete the SER Action Items. Should BWRVIP-116 not be approved by the NRC, a plant-specific reactor vessel surveillance program will be submitted to the NRC two years prior to commencement of the period of extended operation.

Enhancements to the Reactor Vessel Surveillance Program include the following revisions to existing activities that are credited for license renewal:

- Incorporate the requirements and elements of the Integrated Surveillance Program, as documented in BWRVIP-116 and approved by the NRC, or an NRC approved plant-specific program, into the Reactor Vessel Surveillance Program, and include a requirement that if NMPNS surveillance capsules are tested, the tested specimens will be stored in lieu of optional disposal.
- Project analyses of upper shelf energy and pressure temperature limits to 60 years using methods prescribed by Regulatory Guide 1.99, Revision 2, and include the applicable bounds of the data, such as operating temperature and neutron fluence.

Enhancements will be completed prior to the period of extended operation.

A2.1.33 SELECTIVE LEACHING OF MATERIALS PROGRAM

The Selective Leaching of Materials Program is a new program that manages aging of components susceptible to selective leaching. The potentially susceptible components include valve bodies, valve bonnets, pump casings, and heat exchanger components in various systems. This program will be implemented through the One Time Inspection Program prior to the period of extended operation.

A2.1.34 STRUCTURES MONITORING PROGRAM

The Structures Monitoring Program manages aging of structures, structural components, and structural supports WSLR. The program provides for periodic visual inspections, surveys, and examination of all safety related buildings (including the containment buildings and substructures within the primary containment) and various other buildings WSLR. Program activities identify degradation of materials of construction, which include structural steel, concrete, masonry block, sealing materials. While not credited for mitigation of aging, protective coatings are also inspected under this program. The Structures Monitoring Program, which was initially developed to meet the regulatory requirements of 10 CFR 50.65, implements guidance provided in Regulatory Guide 1.160, NUMARC 93-01 and NEI 96-03.

Enhancements to the Structures Monitoring Program include the following revisions to existing activities that are credited for license renewal:

- Expand the program to include the following activities or components WSLR, but not within the current scope of 10 CFR 50.65: (a) NMP2 Fire Rated Assemblies & Watertight Penetration Visual Inspection, (b) NMP2 masonry walls in the Turbine Building and Service Water Tunnel serving a fire barrier function, and the steel electrical transmission towers required for the SBO recovery path.

- Expand the parameters monitored during structural inspections to include those relevant to aging effects requiring management identified for structural bolting.

- Implement regularly scheduled ground water monitoring to ensure that a benign environment is maintained.

Enhancements will be completed prior to the period of extended operation.

A2.1.35 SYSTEMS WALKDOWN PROGRAM

The Systems Walkdown Program manages aging effects for accessible external surfaces of pumps, valves, piping, bolts, heat exchangers, tanks, HVAC components, and other components. Visual inspections identify corrosion, changes in material properties, signs of material degradation, and leakage. The program also identifies adverse conditions that can lead to aggressive environments for systems and components within the scope of LR. Program activities include system engineer walkdowns (i.e., field evaluations of system components to assess material condition), documentation and evaluation of inspection results, and appropriate corrective actions.

- Enhancements to the Systems Walkdown Program include the following revisions to existing activities that are credited for license renewal:Train all personnel performing inspections in the Systems Walkdown Program to ensure that age related degradation is properly identified and incorporate this training into the site training program.

- Specify acceptance criteria for visual inspections to ensure aging related degradation is properly identified and corrected.

Enhancements will be completed prior to the period of extended operation.

A2.1.36 WATER CHEMISTRY CONTROL PROGRAM

The Water Chemistry Control Program manages aging effects by controlling the internal environment of the reactor water, feedwater, condensate, and control rod drive systems, and related auxiliaries (such as the suppression pool, condensate storage tank, and spent fuel pool). The aging effects of concern are (1) loss of material and (2) crack initiation and growth. Program activities include monitoring and controlling concentrations of known detrimental chemical species below the levels known to cause degradation. The Water Chemistry Control Program implements the guidelines for BWR water chemistry presented in EPRI Report TR-103515-R2. This is an exception to the program described in NUREG-1801 (which identifies EPRI TR-103515-R0 as the basis for BWR water chemistry programs).

A2.1.37 BOLTING INTEGRITY PROGRAM

The Bolting Integrity Program manages aging effects due to loss of preload, cracking and loss of material of bolting within the scope of license renewal including safety-related bolting, bolting for NSSS component supports, bolting for other pressure retaining components, and structural bolting. Program activities include periodic inspections of bolting for indication of loss of preload, cracking and loss of material due to corrosion, rust, etc. This program is based on the guidelines delineated in NUREG-1339 and EPRI NP-5769, with exceptions noted in NUREG-1339, for safety-related bolting and EPRI TR-104213 for other bolting.

The Bolting Integrity Program is implemented through the ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program, ASME Section XI Inservice Inspection (Subsection IWE) Program, ASME Section XI Inservice Inspection (Subsection IWF) Program, Structures Monitoring Program, Preventive Maintenance Program, and Systems Walkdown Program.

Enhancements to the Bolting Integrity Program include the following:

- Establish an augmented inspection program for high-strength (actual yield strength ≥ 150 ksi) bolts. This augmented program will prescribe the examination requirements of Tables IWB-2500-1 and IWC-2500-1 of ASME Section XI for high-strength bolts in the class 1 and class 2 component supports, respectively.

- The Structures Monitoring, Preventive Maintenance and Systems Walkdown Programs will be enhanced to include requirements to inspect, bolting for indication of loss of preload, cracking and loss of material, as applicable.

- Include in NMP administrative and implementing program documents references to the Bolting Integrity Program and Industry guidance.

Enhancements will be completed prior to the period of extended operation.

A2.1.38 PROTECTIVE COATING MONITORING AND MAINTENANCE PROGRAM

The NMP2 Protective Coating Monitoring and Maintenance Program is an existing program that is described in the NMP2 response to GL 98-04, "Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System after a Loss-Of-Coolant Accident because of Construction and Protective Coating Deficiencies and Foreign Material in Containment." The program applies to Service Level 1 protective coatings inside the primary containment. The NMP2 suppression pool (wetwell) is not included because it is primarily stainless steel and does not have Service Level 1 coatings. The condition assessments and resulting repair, replacement, or removal activities ensure that the amount of coatings subject to detachment from the substrate during a LOCA is minimized to ensure post-accident operability of the ECCS suction strainers. The Protective Coating Monitoring and Maintenance Program takes exception to certain NUREG-1801, Section XI.S8 (Protective Coating Monitoring and Maintenance Program) evaluation elements, in that it is not credited for prevention of corrosion of carbon steel, the program will be enhanced following the guidance within ASTM D5163-05a, and measurements of cracks, peeling, or delaminated coatings will be estimated via visual methods.

Planned program enhancements include the following:

- Specifying the visual examination of coated surfaces for any visible defects including blistering, cracking, flaking, peeling, and physical or mechanical damage.

- Performance of periodic inspection of coatings every refueling outage versus every 24 months.

- Setting minimum qualifications for inspection personnel, the inspection coordinator, and the inspection results evaluator.

- Performing the thorough visual inspection and areas noted as deficient along with the general visual inspection.

- Specifying the types of instruments and equipment that may be used for the inspection.

- Requiring pre-inspection reviews of the previous two monitoring reports before performing the condition assessment.
- Establishing guidelines for prioritization of repair areas and monitoring these areas until they are repaired.
- Requiring that the inspection results evaluator determine which areas are not acceptable and initiates corrective action.

Enhancements will be completed prior to the period of extended operation.

A2.1.39 NON-EQ ELECTRICAL CABLE METALLIC CONNECTIONS INSPECTION PROGRAM

The Non-EQ Electrical Cable Metallic Connections Inspection Program is a new plant-specific program that manages the aging effects of the metallic portion of electrical cable connections that are not subject the qualification requirements of 10 CFR 50.49, but are still subject to aging effects caused by various stressors. These aging stressors include: thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation. All connections associated with cables that are in scope for license renewal are part of this program. This program is a condition monitoring program that will require periodic inspection of electrical cable metallic connections to ensure that degraded conditions that would affect the ability of the non-EQ electrical cable metallic connections to perform their intended function are identified and corrected.

Analytical trending will not be included in this program because the parameters monitored may vary depending upon the test method selected. This is an exception to the "Monitoring and Trending" element in Appendix A.1.2.3.5 to NUREG-1800. This program will be implemented prior to the period of extended operation.

A2.1.40 WOODEN POWER POLE INSPECTION PROGRAM

The NMP Wooden Power Pole Inspection Program manages the aging of wooden electrical poles that are within the scope for license renewal for recovery from station blackout. Qualified personnel perform inspections to manage material loss and degradation, and physical damage of wooden poles prior to the period of extended operation and every 10 years thereafter. Activities include visual inspections of the entire structure, including cross members and hardware, pole sounding and circumference measurements, below grade inspections, any necessary core boring, preservative application, and pesticide treatments. Corrective actions may include pole reinforcement or replacement. The program inspection activities ensure that in-scope electrical support structures retain their intended functions between inspection cycles.

The Wooden Power Pole Inspection Program is a new program that will be implemented prior to the period of extended operation.

A2.2 TIME-LIMITED AGING ANALYSES SUMMARIES

As part of the application for a renewed license, 10 CFR 54.21(c) requires that an evaluation of TLAAs for the period of extended operation be provided. The following TLAAs have been identified and evaluated to meet this requirement.

A2.2.1 REACTOR VESSEL NEUTRON EMBRITTLEMENT ANALYSIS

The ferritic materials of the reactor vessel are subject to embrittlement due to high energy neutron exposure. The evaluation of reactor vessel neutron embrittlement is a TLAA. The following TLAA discussions are related to the issue of neutron embrittlement:

- Upper Shelf Energy
- Pressure-Temperature (P-T) Limits
- Axial Weld Failure Probability

A2.2.1.1 UPPER-SHELF ENERGY

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.

The USE for the limiting beltline weld materials for 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. Therefore, the USE for the NMP2 RPV beltline materials has been projected (reevaluated) for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(ii).

A2.2.1.2 PRESSURE - TEMPERATURE (P – T) LIMITS

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. 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 Effective Full Power Year (EFPY).

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.

A2.2.1.3 AXIAL WELD FAILURE PROBABILITY

In the safety evaluation presented in *Supplement to Final Safety Evaluation of the BWR Vessel and Internals Project BWRVIP-05 Report* (Reference A2.3.6), 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 5×10^{-6} per reactor year, given the assumptions on flaw density, distribution, and location described in the SER. Projected values of mean Reference Temperature Nil Ductility Transition Temperature (RT_{NDT}) and upper bound RT_{NDT} for the limiting axial welds at NMP2 are below the bounding mean RT_{NDT} value determined by the NRC staff in the SER for BWRVIP-74-A (Reference A2.3.1). Thus, there is reasonable assurance that the RPV failure frequency due to failure of the limiting axial weld is expected to remain less than 5×10^{-6} per reactor year for NMP2.

Inspection of the axial welds in accordance with the ASME XI code requirements will continue at NMP2 during the period of extended operation. Supporting analyses will be completed prior to the period of extended operation to confirm that the RPV axial weld failure probability for the limiting NMP2 axial weld remains 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.

A2.2.2METAL FATIGUE ANALYSIS

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).

Designated plant events have been counted and categorized to ensure that the number of actual operational transient cycles does not exceed the number of transients assumed in the plant design for fatigue. 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. 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.

The following thermal and mechanical fatigue analyses of mechanical components have been identified as TLAAs:

- Reactor Vessel Fatigue Analysis
- ASME Section III Class 1 Piping and Components Fatigue Analysis
- Feedwater (FWS) Nozzle and Control Rod Drive Return Line (CRDRL) Nozzle Fatigue and Cracking Analyses
- Non-ASME Section III Class 1 Piping and Components Fatigue Analysis
- Reactor Vessel Internals Fatigue Analysis
- Environmentally Assisted Fatigue

A2.2.2.1 REACTOR VESSEL FATIGUE ANALYSIS

The original design of RPV pressure boundary components included analyses of fatigue resistance. 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.

For the critical RPV component locations, transients contributing to fatigue usage will be tracked by the FMP (Appendix A2.1.16) with additional usage added to the baseline CUF. 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.

A2.2.2.2 ASME SECTION III CLASS 1 PIPING AND COMPONENTS FATIGUE ANALYSIS

The reactor coolant pressure boundary (RCPB) piping at NMP2 was designed to meet ASME Section III Class 1 requirements for fatigue loading. The subject piping and 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 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.

For the bounding locations for ASME Class 1 systems, transients contributing to fatigue usage will be tracked by the FMP (Appendix A2.1.16) with additional usage added to the baseline CUF.

A2.2.2.3 FEEDWATER (FWS) NOZZLE AND CONTROL ROD DRIVE RETURN LINE (CRDRL) NOZZLE FATIGUE AND CRACKING ANALYSES

BWRs have experienced fatigue crack initiation and growth in Feedwater System (FWS) and Control Rod Drive Return Line (CRDRL) nozzles. 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. NUREG-0619, *BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking*, identifies interim and long-term procedural and design changes to minimize thermal fatigue cracking, as well as inspection requirements.

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 NMP2 FWS nozzles require continued monitoring (including analysis using FatiguePro) to demonstrate compliance over the period of extended operation. Transients contributing to fatigue usage of the FWS nozzles will be tracked by the FMP (Appendix A2.1.16) with additional usage added to the baseline CUF.

In NUREG-0619, 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. Therefore, there are no fatigue concerns associated with the CRDRL nozzle at NMP2.

A2.2.2.4 NON-ASME SECTION III CLASS 1 PIPING AND COMPONENTS FATIGUE ANALYSIS

With the exception of the RCPB piping at NMP2, piping and components WSLR 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. 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.

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 (Reference A2.3.2). 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 indicates higher fatigue usage than expected, Non-ASME Class 1 piping will be evaluated for possible fatigue concerns.

A2.2.2.5 REACTOR VESSEL INTERNALS FATIGUE ANALYSIS

Determination of CUFs was not a design requirement for reactor vessel internals at NMP2. However, certain locations 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.

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.

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 (Appendix A2.1.13), which incorporates comprehensive inspection and evaluation guidelines issued by the BWRVIP and approved by the NRC. 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.

A2.2.2.6 ENVIRONMENTALLY ASSISTED FATIGUE

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 A2.3.2) 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.

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 as part of the FMP (Appendix A2.1.16). 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.

A2.2.3 ENVIRONMENTAL QUALIFICATION (EQ)

The following EQ analyses have been identified as TLAAs:

- Electrical Equipment EQ
- Mechanical Equipment EQ

A2.2.3.1 ELECTRICAL EQUIPMENT EQ

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.

For components within the scope of the EQ Program (Appendix A2.1.15), 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.

A2.2.3.2 MECHANICAL EQUIPMENT EQ

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 A2.3.3). 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.

For components within the scope of the EQ Program (Appendix A2.1.15), 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.

A2.2.4 CONTAINMENT LINER PLATE, METAL CONTAINMENTS, AND PENETRATIONS FATIGUE ANALYSIS

For NMP2, the containment liner analysis has been identified as a TLAA.

A2.2.4.1 CONTAINMENT LINER ANALYSIS

The NMP2 Mark II containment is a reinforced concrete structure consisting of a drywell chamber located above a suppression pool, 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. 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 cumulative usage factors (CUFs) less than 1.0.

A linear projection has been performed of the maximum CUF from the original containment liner fatigue analysis, demonstrating that the CUF remains acceptable for 60 years. The projection is conservative because the main contributor to fatigue usage of the liner is safety/relief valve (SRV) actuation, and SRV actuations are occurring at a rate far less than the rate assumed in the original design.

A2.2.4.2 FATIGUE OF PRIMARY CONTAINMENT PENETRATIONS

The NMP2 penetrations were designed in accordance with ASME Section III, therefore, fatigue analyses exist for all penetrations for the Class 1 and Class MC portions of the penetrations. Fatigue usage calculations for the process pipe, when required, and the associated penetration sleeve (Class MC portion) were performed together. Fatigue tolerant design is demonstrated for components with cumulative usage factors (CUFs) less than 1.0 (or less than 0.1 in break-exclusion zones). For the Class 1 portion of the penetration, additional pipe break postulation criteria are applied to high-energy piping with a CUF greater than 0.1. While the CUFs for all penetrations were shown to be less than the allowable values of 1.0 (or 0.1 in the break exclusion zone), limiting locations are subject to change; thus ASME Class 1 piping and components require continued monitoring (including analysis using FatiguePro) to demonstrate compliance over the period of extended operation.

A2.2.5 OTHER PLANT-SPECIFIC TLAAS

The following Plant-Specific TLAAs have been identified for NMP2:

- RPV Biological Shield
- Main Steam Isolation Valve Corrosion Allowance
- Stress Relaxation of Core Plate Hold Down Bolts

A2.2.5.1 RPV BIOLOGICAL SHIELD

Discovery of weld defects during fabrication of the Biological Shield Wall (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 some flaws required repair (Reference A2.3.4). 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.

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.

A2.2.5.2 MAIN STEAM ISOLATION VALVE CORROSION ALLOWANCE

The Main Steam Isolation Valve (MSIV) bodies were fabricated from carbon 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, USAR Section 5.4.5 indicates a 0.120-inch corrosion allowance was added to the MSIV wall thickness in addition to the minimum required by applicable codes.

To ensure the 40-year corrosion allowance remains valid, ultrasonic wall thickness readings from representative components in the main steam system will be used to predict the wall thinning of the MSIVs, thus ensuring the thickness lost is bounded by the corrosion allowance. Therefore, the aging of the NMP2 MSIV bodies will be adequately managed for the period of extended operation.

A2.2.5.3 STRESS RELAXATION OF CORE PLATE HOLD-DOWN BOLTS

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 A2.3.5 determined that loss of preload should be evaluated as a potential TLAA.

The potential for cracking of components comprising the reactor vessel internals due to IGSCC is managed by the BWR Vessel Internals Program (Appendix A2.1.13). Prior to the period of extended operation, 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 stress relaxation of the NMP2 core plate hold-down bolts will be adequately managed for the period of extended operation.

A2.3 REFERENCES

A2.3.1 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)".*

A2.3.2 NUREG/CR-6260, INEL-95/0045, *Application of NUREG/CR-5999 Interim Fatigue Curves to Selected Nuclear Power Plant Components, February 1995.*

A2.3.3 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.*

A2.3.4 Letter from Niagara Mohawk Power Corporation to U.S. Nuclear Regulatory Commission dated August 1, 1980, forwarding the final

report concerning the Nile Mile Point Unit 2 biological shield wall in accordance with 10 CFR 50, paragraph 50.55(e)(3).

A2.3.5 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).*

A2.3.6 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 Internal Project BWRVIP-05 Report (TAC No. MA3395).*

A2.4 COMMITMENTS

ITEM	COMMITMENT	SOURCE	SCHEDULE
1	Incorporate Appendix A2 into the UFSAR.	LRA Section A 0	Following the issuance of the renewed Operating License
2	In accordance with 10 CFR 54.21(b), during NRC review of this application, provide 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 (LRA).	LRA Section 1.2.1	December 31, 2005
3	Supporting analyses will be completed prior to the period of extended operation to confirm that the failure probabilities for the limiting RPV axial welds remain bounded for the period of extended operation.	LRA Section 4.2.4 and Appendix A.2.2.1.3	Prior to Period of Extended Operation
4	For those locations where additional fatigue analysis is required to take advantage of the implicit margin, and to more accurately determine cumulative usage factor (CUFs), the EPRI FatiguePro fatigue monitoring software will be implemented prior to the period of extended operation.	LRA Section 4.3 and Appendices A2.2.2 and B 3.2	Prior to Period of Extended Operation
5	For the critical reactor vessel component locations, shown in Table 4.3-4 of the LRA, additional usage will be added to the baseline Cumulative Usage Factor using one of the methods described in Section 4.3 of the LRA.	LRA Section 4.3.1 and Appendix A2.2.2.1	Prior to Period of Extended Operation
6	For the bounding locations for ASME Class 1 systems, transients contributing to fatigue usage will be tracked by the Fatigue Monitoring Program (FMP) with additional usage added to the baseline Cumulative Usage Factor (CUF) using the design Cycle Based Fatigue (CBF) method described in Section 4.3 of the LRA. 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.	LRA Section 4.3.2 and Appendix A2.2.2.2	Prior to Period of Extended Operation
7	Transients contributing to fatigue usage of the FWS nozzles will be tracked by the FMP with additional usage added to the baseline Cumulative Usage Factor using the Stress Based fatigue method described in Section 4.3 of the LRA.	LRA Section 4.3.3 and Appendix A2.2.2.3	Prior to Period of Extended Operation
8	If fatigue monitoring of ASME Class 1 piping (described in LRA Section 4.3.2) indicates higher fatigue usage than expected, non-ASME Class 1 piping will be evaluated for possible fatigue concerns.	LRA Section 4.3.4 and Appendix A2.2.2.4	Prior to Period of Extended Operation
9	Revise or evaluate the Cumulative Usage Factor evaluations for the shroud, core support plate and studs, and jet pumps to remove conservatism and/or encompass the period of extended operation (e.g., a more extensive fatigue analysis of the jet pumps will be performed).	LRA Section 4.3.5 and Appendix A2.2.2.5	Prior to Period of Extended Operation

ITEM	COMMITMENT	SOURCE	SCHEDULE
10	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, as part of the Fatigue Monitoring Program. These locations will be evaluated by applying environmental correction factors (F_{en}) to existing and future fatigue analyses.	LRA Section 4.3.6 and Appendices A2.2.2.6 and B3.2	Prior to Period of Extended Operation
11	For penetrations listed in Table 4.6-4 of the LRA, transients contributing to fatigue usage will be tracked by the NMPNS FMP with additional usage added to the baseline Cumulative Usage Factor using the design Cycle Based Fatigue method described in Section 4.3 of the LRA.	LRA Section 4.6.5	Prior to Period of Extended Operation
12	NMPNS 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.	LRA Section 4.7.3 and Appendix A2.2.5.3	Prior to Period of Extended Operation
13	Enhance the BWR VIP to address (1) BWRVIP-18, 41 and 42 open items regarding the inspection of inaccessible welds for core spray, jet pump and low pressure coolant injection components, respectively. As such, NMPNS will implement the resolution of these open items as documented in the BWRVIP response and reviewed and accepted by the NRC; (2) The inspection and evaluation guidelines for steam dryers and access hole covers are currently under development by the BWRVIP committee. Once these guidelines are documented, and reviewed and accepted by the NRC, the actions will be implemented in accordance with the BWRVIP program; (3) The baseline inspections recommended in BWRVIP-47 for the BWR lower plenum components will be incorporated into the appropriate program and implementing documents; and (4) A schedule for additional inspections of the top guide locations (using EVT 1 or techniques demonstrated to be appropriate in BWRVIP-03) will be incorporated into the appropriate program and implementing documents. A minimum of 10% of the locations will be inspected within 12 years of the beginning of the period of extended operation, with at least 5% of the inspections completed within 6 years.	LRA Appendix B2.1.8	Prior to Period of Extended Operation

ITEM	COMMITMENT	SOURCE	SCHEDULE
14	Enhance the Open Cycle Cooling Water System (OCCWS) to (1) Ensure that the applicable commitments made for GL 89-13, and the requirements in NUREG-1801, Section XI.M20 are captured in N2-TDP-REL-0104, "GL 89-13, Service Water System Problems Affecting Safety Related Equipment Program Plan"; (2) Incorporate into the OCCWS program, the requirements of the NUREG-1801, Section XI.M20 that are more conservative than the GL 89-13 commitments; and (3) Revise the preventive maintenance and heat transfer performance test procedures to incorporate specific inspection criteria, corrective actions, and frequencies.	LRA Appendix B2.1.10	Prior to Period of Extended Operation
15	Enhance the Closed Cycle Cooling Water System (CCCWS) Program to (1) Expand periodic chemistry checks of the system consistent with the guidelines of EPRI TR-107396; (2) Implement a program to use corrosion inhibitors in the Reactor Building Closed Loop Systems (RBCL) and Control Building Ventilation Chilled Water System (CBVCWS) in accordance with the guidelines given in EPRI TR-107396; (3) Direct periodic inspections to monitor for loss of material in the piping of the CCCW systems; (4) Establish the frequencies to inspect for degradation of components in CCCWS, including heat exchanger tube wall thinning; (5) Establish periodic monitoring, trending, and evaluation of performance parameters for the RBCL Cooling and CBVCWS; (6) Specify chemistry sampling frequency for the CBVCWS; (7) Provide the controls and sampling necessary to maintain water chemistry parameters in CCCWS within the guidelines of EPRI Report TR 107396; and (8) Ensure acceptance criteria are specified in the implementing procedures for the applicable indications of degradation.	LRA Appendix B2.1.11	Prior to Period of Extended Operation
16	Revise applicable procedures related to the Crane Inspection Program to add specific direction for performance of pre lift corrosion inspections, with acceptance criteria, for certain hoist lifting assembly components.	LRA Appendix B2.1.13	Prior to Period of Extended Operation
17	Enhance the Fire Protection Program to (1) Incorporate periodic visual inspections of piping and fittings located in a non-water environment such as Halon and Carbon Dioxide fire suppression systems components, to detect evidence of corrosion and any system mechanical damage that could affect its intended function; (2) Expand the scope of periodic functional tests of the diesel-driven fire pump to include inspection of engine exhaust system components to verify that loss of material is managed; and (3) Perform an engineering evaluation to determine the plant specific inspection periodicity of fire doors.	LRA Appendix B2.1.16	Prior to Period of Extended Operation

ITEM	COMMITMENT	SOURCE	SCHEDULE
18	Enhance the Fire Water System Program by revising applicable existing procedures to (1) incorporate inspections to detect and manage loss of material due to corrosion into existing periodic test procedures; (2) specify periodic component inspections to verify that loss of material is being managed; (3) add procedural guidance for performing visual inspections to monitor internal corrosion and detect biofouling; (4) add requirements to periodically check the water-based fire protection systems for microbiological contamination; (5) measure fire protection system piping wall thickness using non-intrusive techniques (e.g., volumetric testing) to detect loss of material due to corrosion; (6) establish an appropriate means of recording, evaluating, reviewing, and trending the results of visual inspections and volumetric testing; and (7) define acceptance criteria for visual inspections and volumetric testing.	LRA Appendix B2.1.17	Prior to Period of Extended Operation
19	Enhance the Fuel Oil Chemistry Program to (1) Provide guidelines for the appropriate use of biocides, corrosion inhibitors, and/or fuel stabilizers to maintain fuel oil quality; (2) Add a requirement to sample the diesel fuel oil storage tanks for water and sediment at least quarterly per the ASTM standard; (3) Add requirements to periodically inspect the interior surfaces of the fuel oil tanks for evidence of significant degradation, including a specific requirement that the tank bottom thickness be determined; (4) Add a requirement for quarterly trending of particulate contamination analysis results; and (5) Ensure acceptance criteria are specified in the implementing procedures for the applicable indications of potential degradation.	LRA Appendix B2.1.18	Prior to Period of Extended Operation
20	Enhance the Reactor Vessel Surveillance program to (1) Incorporate the requirements and elements of the Integrated Surveillance Program (ISP), as documented in BWRVIP-116 and approved by NRC, or an NRC approved plant-specific program into the Reactor Vessel Surveillance Program, and include a requirement that if NMPNS surveillance capsules are tested, the tested specimens will be stored in lieu of optional disposal. When the NRC issues a final safety evaluation report (SER) for BWRVIP-116, NMPNS will address any open items and complete the SER Action Items. Should BWRVIP-116 not be approved by the NRC, a plant specific reactor vessel surveillance program will be submitted to the NRC two years prior to commencement of the period of extended operation; and (2) Project analyses of upper shelf energy and pressure temperature limits to 60 years using methods prescribed by Regulatory Guide 1.99, Revision 2, and include the applicable bounds of the data, such as operating temperature and neutron fluence.	LRA Appendix B2.1.19	Prior to Period of Extended Operation
21	Develop and implement a One-Time Inspection Program, which also includes the attributes for a selective Leaching of Materials Program.	LRA Appendices B2.1.20 and B 2.1.21	Prior to Period of Extended Operation

ITEM	COMMITMENT	SOURCE	SCHEDULE
22	Develop and implement a Buried Piping and Tank Inspection Program which includes a requirement that if an opportunistic inspection does not occur within the first ten years of extended operation, NMPNS will excavate a representative sample for the purpose of inspection.	LRA Appendix B2.1.22	Prior to Period of Extended Operation
23	An augmented VT-1 visual examination of the containment penetration bellows will be performed using enhanced techniques qualified for detecting SCC, per NUREG-1611, Table 2, Item 12.	LRA Appendix B2.1.23	Prior to Period of Extended Operation
24	Enhance the Structures Monitoring Program to (1) Expand the program to include the following activities or components in the scope of License Renewal but not within the current scope of 10 CFR 50.65: (a) Fire Rated Assemblies & Watertight Penetration Visual Inspections (b) masonry walls in the Turbine Building and Service Water Tunnel serving a fire barrier function (c) the steel electrical transmission towers required for the SBO and recovery paths; (2) Expand the parameters monitored during structural inspections to include those relevant to aging effects identified for structural bolting; and (3) Implement regularly scheduled ground water monitoring to ensure that a benign environment is maintained.	LA Appendix B2.2.27 and B 2.1.28	Prior to Period of Extended Operation
25	Develop and implement a Non-EQ Electrical Cables and Connection Program.	LRA Appendix B2.1.29	Prior to Period of Extended Operation
26	Enhance the Non-EQ Electrical Cable and Connections Used in Instrumentation Circuit Program to (1) Implement reviews of calibration or surveillance data for indications of aging degradation affecting instrument circuit performance. The first reviews will be completed prior to the period of extended operation and every ten years thereafter; and (2) In cases where a calibration or surveillance program does not include the cabling system in the testing circuit, or as an alternative to the review of calibration results described above, provide requirements and procedures to perform cable testing to detect deterioration of the insulation system, such as insulation resistance tests or other testing judged to be effective in determining cable insulation condition. The first test will be completed prior to the period of extended operation. The test frequency of these cables shall be determined based on engineering evaluation not to exceed every 10 years.	LRA Appendix B2.1.30	Prior to Period of Extended Operation

ITEM	COMMITMENT	SOURCE	SCHEDULE
27	Enhance the Preventive Maintenance Program to (1) Expand the PM Program to encompass activities for certain additional components, identified as requiring Aging Management. Explicitly define the aging management attributes, including the systems and the component types/commodities included in the program; (2) specifically list those activities credited for aging management; (3) specifically list parameters monitored; (4) specifically list the aging effects detected; (5) establish a requirement that inspection data be monitored and trended; and (6) establish detailed parameter-specific acceptance criteria.	LRA Appendix B2.1.32	Prior to Period of Extended Operation
28	Enhance the System Walkdown Program to (1) Train all personnel performing inspections in the Systems Walk-down Program to ensure that age related degradation is properly identified and incorporate this training into the site training program; and (2) Specify acceptance criteria for visual inspections to ensure aging related degradation is properly identified and corrected.	LRA Appendix B2.1.33	Prior to Period of Extended Operation
29	Enhance the Non-Segregated Bus Inspection Program to expand visual inspections of the bus ducts, their supports and insulation systems. Also, new provisions will be made to perform either periodic low range resistance checks of the bus ducts or torque checks of a statistical sample of accessible bolted connections.	LRA Appendix B2.1.34	Prior to Period of Extended Operation
30	Develop and implement a Fuse Holder Inspection Program.	LRA Appendix B2.1.35	Prior to Period of Extended Operation
31	Enhance the Bolting Integrity Program to (1) The Structures Monitoring, Preventive Maintenance and Systems Walk-down Programs will be enhanced to include requirements to inspect bolting for indication of loss of preload, cracking, and loss of material, as applicable; (2) Include in NMP administrative and implementing program documents references to the Bolting Integrity Program and Industry guidance; and (3) Establish an augmented inspection program for high-strength (actual yield strength ≥ 150 ksi) bolts. This augmented program will prescribe the examination requirements of Tables IWB-2500-1 and IWC-2500-1 of ASME Section SI for high-strength bolts in the Class 1 and Class 2 component supports, respectively.	LRA Appendix B2.1.36	Prior to Period of Extended Operation

ITEM	COMMITMENT	SOURCE	SCHEDULE
32	Enhance the Protective Coating Monitoring and Maintenance Program to (1) specify the visual examination of coated surfaces for any visible defects includes blistering, cracking, flaking, peeling, and physical or mechanical damage; (2) perform periodic inspection of coatings every refueling outage versus every 24 months; (3) set minimum qualifications for inspection personnel, the inspection coordinator, and the inspection results evaluator; (4) perform thorough visual inspections in areas noted as deficient concurrently with the general visual inspection; (5) specify the types of instruments and equipment that may be used for the inspection; (6) pre-inspection reviews of the previous two monitoring reports before performing the condition assessment; (7) establishment of guidelines for prioritization of repair areas and monitoring these areas until they are repaired; and (8) to require that the inspection results evaluator determine which areas are unacceptable and initiate corrective action.	LRA Appendix B2.1.38	Prior to Period of Extended Operation
33	Develop and implement a Non-EQ Electrical Cable Metallic Connections Inspection Program.	LRA Appendix B2.1.39	Prior to Period of Extended Operation
34	Develop and implement a Wooden Power Pole Inspection Program.	LRA Appendix B2.1.40	Prior to Period of Extended Operation
35	Maintenance procedure for inspection of the Orificed Fuel Support casting will be enhanced to include a sample VT-1 inspection of the casting and EVT-1 inspection if any evidence of impact or mishandling is identified.	LRA Appendix B2.1.8	Prior to Period of Extended Operation

A2.5 GENERIC QUALITY ASSURANCE PROGRAM REQUIREMENTS FOR LICENSE RENEWAL

The NMP Quality Assurance Program implements the requirements of 10 CFR 50, Appendix B, and is consistent with the summary in Appendix A.2 of NUREG-1800, "Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants," published July 2001. The elements of corrective action, confirmation process, and administrative controls in the Quality Assurance Program are applicable to both safety-related and non-safety related systems, structures, and components that are subject to an aging management review. Generically, these three elements are applicable as follows:

Corrective Actions

Corrective actions are implemented in accordance with the requirements of 10 CFR 50, Appendix B, as committed in the NMP2 USAR, Appendix B. The NMP corrective action program provides for the identification, evaluation, and resolution of non-conforming conditions.

Confirmation Process

The confirmation process is part of the corrective action program, which is implemented in accordance with the requirements of 10 CFR 50, Appendix B, as committed in the NMP2 USAR, Appendix B. The focus of the confirmation process is on the verification that corrective actions are effective. The measure of effectiveness is in terms of correcting the adverse condition and precluding repetition of significant conditions adverse to quality.

Administrative Controls

Aging management programs are implemented through various plant documents. These implementing documents are subject to administrative controls, including a formal review and approval process, in accordance with the requirements of 10 CFR 50, Appendix B, as committed in the NMP2 USAR, Appendix B.

B1.0 INTRODUCTION

B1.1 OVERVIEW

License renewal aging management program (AMP) descriptions are provided in this appendix for each program credited for managing aging effects based upon the aging management review (AMR) results provided in Sections 3.1 through 3.6 of this application. The information in this appendix applies to both NMP1 and NMP2, unless otherwise specified.

Each AMP described in this section has ten elements which are consistent with the definitions in Section A.1, *Aging Management Review - Generic*, and Table A.1-1, "Elements of an Aging Management Program for License Renewal", of NUREG-1800 (Reference 1). The 10-element detail is only provided when the program is plant-specific. See Section B1.2 below.

B1.2 METHOD OF DISCUSSION

For those AMPs that are consistent with the assumptions made in Sections X and XI of NUREG-1801 (Reference 2), or are consistent with exceptions, each program discussion is presented in the following format:

- A Program Description abstract of the overall program form and function is provided.
- A NUREG-1801 Consistency statement is made about the program.
- Exceptions to the NUREG-1801 program are outlined and a justification is provided.
- Enhancements to ensure consistency with NUREG-1801 or additions to the NUREG-1801 program to manage aging for additional components with aging effects not assumed in NUREG-1801 for the NUREG-1801 program. A proposed schedule for completion is discussed.
- Operating Experience information specific to the program is provided.
- A Conclusion section provides a statement of reasonable assurance that the program is effective, or will be effective, once enhanced.

For those programs that are plant-specific, the above form is generally followed with the additional discussion of each of the ten elements.

B1.3 QUALITY ASSURANCE PROGRAM AND ADMINISTRATIVE CONTROLS

The Quality Assurance Program implements the requirements of 10 CFR 50, Appendix B (Reference 3), and is consistent with the summary in Appendix A.2 of NUREG-1800 (Reference 1). The Quality Assurance Program includes the elements of corrective action, confirmation process, and administrative controls, and is applicable to the safety-related and non-safety related systems, structures, and components (SSCs) that are subject to AMR. In many cases, existing activities were found adequate for managing aging effects during the period of extended operation. Generically the three elements are applicable as follows:

Corrective Actions

A single corrective actions process is applied regardless of the safety classification of the structure or component. Corrective actions are implemented through the initiation of a Deviation/Event Report (DER) in accordance with plant procedures established in response to 10 CFR 50, Appendix B. Site documents that implement aging management activities for license renewal will direct that a DER be prepared in accordance with those procedures whenever non-conforming conditions are found (i.e., the acceptance criteria are not met).

Equipment deficiencies are corrected through the initiation of a Work Order (WO) in accordance with plant procedures. Although equipment deficiencies may initially be documented by a WO, the corrective action process specifies that a DER also be initiated if required.

Confirmation Process

The focus of the confirmation process is on the follow-up actions that must be taken to verify effective implementation of corrective actions. The measure of effectiveness is in terms of correcting the adverse condition and precluding repetition of significant conditions adverse to quality. Plant procedures include provisions for timely evaluation of adverse conditions and implementation of any corrective actions required, including root cause determinations and prevention of recurrence where appropriate (e.g., significant conditions adverse to quality). These procedures provide for tracking, coordinating, monitoring, reviewing, verifying, validating, and approving corrective actions, to ensure effective corrective actions are taken. The DER process is also monitored for potentially adverse trends. The existence of an adverse trend due to recurring or repetitive adverse conditions will result in the initiation of a DER. The aging management activities required for license renewal would also uncover any unsatisfactory condition due to ineffective corrective action.

Since the same 10 CFR 50, Appendix B corrective actions and confirmation processes are applied for nonconforming Safety Related (SR) and Non-Safety Related (NSR) structures and components subject to an AMR for license renewal, the corrective action program is consistent with the NUREG-1801 elements.

Administrative Controls

Administrative controls procedures provide information on procedures and other forms of administrative control documents, as well as guidance on classifying documents into the proper document type.

B1.4 OPERATING EXPERIENCE

Industry operating experience was incorporated into the license renewal process through a review of industry documents published after issuance of NUREG-1801 (Reference 2) to identify aging effects and mechanisms. Plant-specific operating experience (as documented through the plant's corrective action program) was reviewed to identify aging effects experienced. Additional interviews were conducted with AMP owners at NMPNS to collect and document evidence of operating experience.

Industry and plant-specific documents identified through the reviews described above were examined to determine if they involved aging effects pertinent to SSCs within the scope of license renewal (WSLR) at NMPNS. Pertinent operating experience documents were then categorized with respect to (1) the material and environment involved in the aging effect, (2) the AMP that manages the aging effect, and (3) the SSCs affected. If aging effects and mechanisms were identified that had not been identified previously as relevant for the material/environment combination of interest, AMR results were adjusted accordingly. If no existing program managed the identified aging effect, a new AMP was considered.

Each program summary in this appendix contains a discussion of operating experience relevant to the program, including past corrective actions resulting in program enhancements. This information provides objective evidence that the effects of aging have been, and will continue to be, adequately managed.

B1.5 AGING MANAGEMENT PROGRAMS

The following AMPs are described in Section B2.0 of this appendix as indicated. These programs apply to both NMP1 and NMP2 unless otherwise specified. The programs are either discussed in NUREG-1801 (Section XI) or are plant-specific. Plant-specific programs are listed at the end of the table in Section B2.0. Programs are identified as either existing or new.

1. 10 CFR 50 Appendix J Program (Section B2.1.26) [Existing]
2. ASME Section XI Inservice Inspection (Subsection IWE) Program (Section B2.1.23) [Existing]
3. ASME Section XI Inservice Inspection (Subsection IWF) Program (Section B2.1.25) [Existing]
4. ASME Section XI Inservice Inspection (Subsection IWL) Program (Unit 2 only) (Section B2.1.24) [Existing]
5. ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program (Section B2.1.1) [Existing]
6. Boraflex Monitoring Program (Section B2.1.12) [Existing]
7. Buried Piping and Tanks Inspection Program (Section B2.1.22) [New]
8. BWR Feedwater Nozzle Program (Section B2.1.5) [Existing]
9. BWR Penetrations Program (Section B2.1.7) [Existing]
10. BWR Reactor Water Cleanup System Program (Section B2.1.15) [Existing]
11. BWR Stress Corrosion Cracking Program (Section B2.1.6) [Existing]
12. BWR Vessel ID Attachment Welds Program (Section B2.1.4) [Existing]
13. BWR Vessel Internals Program (Section B2.1.8) [Existing]
14. Closed-Cycle Cooling Water System Program (Section B2.1.11) [Existing]
15. Compressed Air Monitoring Program (NMP1 only) (Section B2.1.14) [Existing]
16. Fire Protection Program (Section B2.1.16) [Existing]
17. Fire Water System Program (Section B2.1.17) [Existing]

18. Flow-Accelerated Corrosion Program (Section B2.1.9) [Existing]

19. Fuel Oil Chemistry Program (Section B2.1.18) [Existing]

20. Fuse Holder Inspection Program (Section B2.1.35) [New]

21. Inspection of Overhead Heavy Load and Light Load Handling Systems Program (Section B2.1.13) [Existing]

22. Masonry Wall Program (Section B2.1.27) [Existing]

23. Non-EQ Electrical Cables and Connections Program (Section B2.1.29) [New]

24. Non-EQ Electrical Cables and Connections Used in Instrumentation Circuits Program (Section B2.1.30) [Existing]

25. DELETED

26. Non-Segregated Bus Inspection Program (Section B2.1.34) [Existing]

27. One-Time Inspection Program (Section B2.1.20) [New]

28. Open-Cycle Cooling Water System Program (Section B2.1.10) [Existing]

29. Preventive Maintenance Program (Section B2.1.32) [Existing]

30. Reactor Head Closure Studs Program (Section B2.1.3) [Existing]

31. Reactor Vessel Surveillance Program (Section B2.1.19) [Existing]

32. Selective Leaching of Materials Program (Section B2.1.21) [New]

33. Structures Monitoring Program (Section B2.1.28) [Existing]

34. Systems Walkdown Program (Section B2.1.33) [Existing]

35. Water Chemistry Control Program (Section B2.1.2) [Existing]

36. Bolting Integrity Program (Section B2.1.36) [Existing]

37. BWR Control Rod Drive Return Line (CRDRL) Nozzle Program (Section B2.1.37) [Existing]

38. Protective Coating Monitoring and Maintenance Program (Section B2.1.38) [Existing]

39. Non-EQ Electrical Cable Metallic Connections Inspection Program (Section B2.1.39) [New]

40. Wooden Power Pole Inspection Program (NMP2 Only) (Section B2.1.40) [New]

B1.6 TIME LIMITED AGING ANALYSES AGING MANAGEMENT PROGRAMS

The following Time Limited Aging Analyses AMPs are described in Section B3.0 of this appendix as indicated. These programs apply to both NMP1 and NMP2 unless otherwise specified. The programs are either discussed in NUREG-1801 (Section X) or are plant-specific. Plant-specific programs are listed at the end of the table in Section B3.0. Programs are identified as either existing or new.

1. Environmental Qualification Program (Section B3.1) [Existing]

2. Fatigue Monitoring Program (Section B3.2) [Existing]

3. Torus Corrosion Monitoring Program (NMP1 only) (Section B3.3) [Existing]

B2.0 AGING MANAGEMENT PROGRAMS

The correlation between NUREG-1801 (Section XI) programs and the NMPNS programs is shown below. For the NMPNS Programs, links to appropriate sections of this appendix are provided.

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	NINE MILE POINT PROGRAM
XI.M1	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program (Section B2.1.1)
XI.M2	Water Chemistry	Water Chemistry Control Program (Section B2.1.2)
XI.M3	Reactor Head Closure Studs	Reactor Head Closure Studs Program (Section B2.1.3)
XI.M4	BWR Vessel ID Attachment Welds	The BWR Vessel ID Attachment Welds Program is described in Section B2.1.4, and is implemented by the BWR Vessel Internals Program (Section B2.1.8).
XI.M5	BWR Feedwater Nozzle	BWR Feedwater Nozzle Program (Section B2.1.5)
XI.M6	BWR Control Rod Drive Return Line Nozzle	BWR Control Rod Drive Return Line (CRDRL) Nozzle Program (Section B2.1.37)
XI.M7	BWR Stress Corrosion Cracking	BWR Stress Corrosion Cracking Program (Section B2.1.6)
XI.M8	BWR Penetrations	The BWR Penetrations Program is described in Section B2.1.7, and is implemented by the BWR Vessel Internals Program (Section B2.1.8).
XI.M9	BWR Vessel Internals	BWR Vessel Internals Program (Section B2.1.8)

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	NINE MILE POINT PROGRAM
XI.M10	Boric Acid Corrosion	Not applicable. NMP1 and NMP2 are BWRs.
XI.M11	Nickel-Alloy Nozzles and Penetrations	Not applicable. NMP1 and NMP2 are BWRs.
XI.M12	Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)	Not applicable. Inservice Inspection Program requirements described in Section B2.1.1 are adequate for all potentially susceptible components at NMPNS.
XI.M13	Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS)	Not applicable. Potentially susceptible components at NMPNS are evaluated and inspected as part of the BWR Vessel Internals Program (Section B2.1.8).
XI.M14	Loose Part Monitoring	Not applicable. This program is not credited for aging management at NMPNS.
XI.M15	Neutron Noise Monitoring	Not applicable. NMP1 and NMP2 are BWRs.
XI.M16	PWR Vessel Internals	Not applicable. NMP1 and NMP2 are BWRs.
XI.M17	Flow-Accelerated Corrosion	Flow-Accelerated Corrosion Program (Section B2.1.9)
XI.M18	Bolting Integrity	Bolting Integrity Program (Section B2.1.36)
XI.M19	Steam Generator Tube Integrity	Not applicable. NMP1 and NMP2 are BWRs.
XI.M20	Open-Cycle Cooling Water System	Open-Cycle Cooling Water System Program (Section B2.1.10)
XI.M21	Closed-Cycle Cooling Water System	Closed-Cycle Cooling Water System Program (Section B2.1.11)

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	NINE MILE POINT PROGRAM
XI.M22	Boraflex Monitoring	Boraflex Monitoring Program (NMP1 only) (Section B2.1.12)
XI.M23	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems	Inspection of Overhead Heavy Load and Light Load Handling Systems Program (Section B2.1.13)
XI.M24	Compressed Air Monitoring	Compressed Air Monitoring Program (NMP1 only) (Section B2.1.14).
XI.M25	BWR Reactor Water Cleanup System	BWR Reactor Water Cleanup System Program (Section B2.1.15)
XI.M26	Fire Protection	Fire Protection Program (Section B2.1.16)
XI.M27	Fire Water System	Fire Water System Program (Section B2.1.17)
XI.M28	Buried Piping and Tanks Surveillance	Not applicable. This program is not credited for aging management at NMPNS. See XI.M34, Buried Piping and Tanks Inspection Program (Section B2.1.22)
XI.M29	Aboveground Carbon Steel Tanks	Not applicable. This program is not credited for aging management at NMPNS.
XI.M30	Fuel Oil Chemistry	Fuel Oil Chemistry Program (Section B2.1.18)
XI.M31	Reactor Vessel Surveillance	Reactor Vessel Surveillance Program (Section B2.1.19)
XI.M32	One-Time Inspection	One-Time Inspection Program (Section B2.1.20)

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	NINE MILE POINT PROGRAM
XI.M33	Selective Leaching of Materials	The Selective Leaching of Materials Program is described in Section B2.1.21, and is implemented by the One-Time Inspection Program (Section B2.1.20).
XI.M34	Buried Piping and Tanks Inspection	Buried Piping and Tanks Inspection Program (Section B2.1.22)
XI.S1	ASME Section XI, Subsection IWE	ASME Section XI Inservice Inspection (Subsection IWE) Program (Section B2.1.23)
XI.S2	ASME Section XI, Subsection IWL	ASME Section XI Inservice Inspection (Subsection IWL) Program (Unit 2 only) (Section B2.1.24)
XI.S3	ASME Section XI, Subsection IWF	ASME Section XI Inservice Inspection (Subsection IWF) Program (Section B2.1.25)
XI.S4	10 CFR Part 50, Appendix J	10 CFR 50 Appendix J Program (Section B2.1.26)
XI.S5	Masonry Wall Program	The Masonry Wall Program is described in Section B2.1.27, and is implemented by the Structures Monitoring Program (Section B2.1.28).
XI.S6	Structures Monitoring Program	Structures Monitoring Program (Section B2.1.28)
XI.S7	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants	Not applicable. This program is not credited for aging management since there are no water-control structures for emergency cooling operation or flood protection at NMPNS.

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	NINE MILE POINT PROGRAM
XI.S8	Protective Coating Monitoring and Maintenance Program	Protective Coating Montiroing and Maintenance Progrm (Section B2.1.38).
XI.E1	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Non-EQ Electrical Cables and Connections Program (Section B2.1.29)
XI.E2	Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits	Non-EQ Electrical Cables Used in Instrumentation Circuits Program (Section B2.1.30)
XI.E3	Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Not applicable. This program is not credited for aging management at NMPNS.
N/A	Plant-Specific Program	Preventive Maintenance Program (Section B2.1.32)
N/A	Plant-Specific Program	Systems Walkdown Program (Section B2.1.33)
N/A	Plant-Specific Program	Non-Segregated Bus Inspection Program (Section B2.1.34)
N/A	Plant-Specific Program	Fuse Holder Inspection Program (Section B2.1.35)
N/A	Plant Specific Program	Non-EQ Electrical Cable Metallic Connections Inspection Program (Section B2.1.39)
N/A	Plant Specific Program	Wooden Power Pole Inspection Program (NMP2 Only) (Section B2.1.40)

B2.1 AGING MANAGEMENT PROGRAMS

B2.1.1 ASME SECTION XI INSERVICE INSPECTION (SUBSECTIONS IWB, IWC, IWD) PROGRAM

Program Description

The American Society of Mechanical Engineers (ASME) Section XI Inservice Inspection (ISI) (Subsections IWB, IWC, IWD) Program (referred to herein as the IWB/C/D ISI Program) is an existing program that manages aging of Class 1, 2, and 3 pressure-retaining components and their integral attachments. Program activities include periodic visual, surface, and/or volumetric examination and pressure tests of Class 1, 2, and 3 pressure-retaining components. The IWB/C/D ISI Program is based on ASME Section XI, 1989 edition, with no Addenda and ASME Section XI, Appendix VIII, 1995 Edition through 1996 Addenda. Examination categories B-F, B-J, C-F-1, C-F-2 and IGSCC Category A are inspected using the EPRI risk-informed methodology and implemented in accordance with ASME Code Case N-578-1 as approved by NRC plant-specific Relief Request.

NUREG-1801 Consistency

The IWB/C/D ISI Program is an existing program that takes exception to certain NUREG-1801, Section XI.M1 (ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD) evaluation elements (Reference 2).

Exceptions to NUREG-1801

The program described in NUREG-1801, Section XI.M1, cites ASME Section XI requirements covered in the 1995 edition through the 1996 addenda. The IWB/C/D ISI programs for NMP1 and NMP2 are based on the 1989 edition with no addenda. This was found acceptable by the NRC in Safety Evaluation Reports (SERs) dated October 5, 2000 (Enclosure to Reference 24) and March 3, 2000 (Enclosure to Reference 25), respectively. Additionally, the IWB/C/D ISI programs for NMP1 and NMP2 implement the EPRI risk-informed methodology and ASME Code Case N-578-1..This was found acceptable by the NRC in Safety Evaluation Reports (SERs) dated September 4, 2002 (Enclosure to Reference 41) and May 31, 2001 (Enclosure 1 to Reference 11), respectively.

Program Elements Affected

Detection of Aging Effects, Monitoring and Trending

Program activities are implemented through the IWB/C/D ISI program plans submitted to the NRC as identified in the SERs listed above.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the IWB/C/D ISI Program. Review of plant-specific operating experience revealed DERs documenting indications of flaws in recirculation components, piping, and various nozzle connection welds. Deficiencies identified by IWB/C/D ISI Program activities have been repaired, replaced, or evaluated as acceptable in accordance with ASME Section XI and station implementing procedures.

The plant continuously reviews industry operating experience to determine its applicability to NMPNS and adjusts inspection plans accordingly. Plant-specific operating experience is reviewed and trended; findings are documented, reviewed, and resolved; corrective actions are taken; and mitigative actions to limit aging initiated.

Conclusion

The IWB/C/D ISI Program has been effective in managing aging of Class 1, 2, and 3 pressure-retaining components and their integral attachments.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the IWB/C/D ISI Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.2 WATER CHEMISTRY CONTROL PROGRAM

Program Description

The Water Chemistry Control Program is an existing program that manages aging effects by controlling the internal environment of the reactor water, feedwater, condensate, and control rod drive systems, and related auxiliaries (such as the NMP1 torus, NMP2 suppression pool, condensate storage tank, and spent fuel pool). The aging effects of concern are (1) loss of material and (2) crack initiation and growth. Program activities include monitoring and controlling concentrations of known detrimental chemical species below the levels known to cause degradation. The Water Chemistry Control Program implements the guidelines for BWR water chemistry presented in Electric Power Research Institute (EPRI) Reports TR-103515-R1 (Reference 4) and TR-103515-R2 (Reference 28).

The Water Chemistry Control Program credits activities performed under the direction of the ASME Section XI Inservice Inspection (IWB, IWC, IWD) Program (Section B2.1.1) and the One-Time Inspection Program (Section B2.1.20) to verify program effectiveness, including areas of low flow or stagnant water.

NUREG-1801 Consistency

The Water Chemistry Control Program is an existing program that takes exception to certain NUREG-1801, Section XI.M2 (Water Chemistry) evaluation elements (Reference 2).

Exceptions to NUREG-1801

The program described in NUREG-1801, Section XI.M2, identifies the EPRI TR-103515-R0 report as the basis for BWR water chemistry programs. EPRI periodically updates the water chemistry guidelines as new industry experience becomes available. Revisions 1 and 2 of the EPRI report incorporate the industry experience and are the basis for the NMP1 Water Chemistry Control Program whereas NMP2 uses only Revision 2 of TR-103515.

Program Elements Affected

Scope

NUREG-1801 identifies the EPRI TR-103515-R0 report as the basis for water chemistry control at BWRs. The Water Chemistry Control Programs at NMP1 and NMP2 are based upon Revisions 1 and 2 of the EPRI report. The specific exceptions are identified under the applicable program elements below.

Parameters Monitored/Inspected

EPRI TR-103515-R0 recommends electrochemical potential (ECP) to be monitored during power operations and does not distinguish between normal water chemistry (NWC) and hydrogen water chemistry (HWC). NMP1 takes an exception to this in that ECP is only monitored under HWC operation. This is justified since this is consistent with the latest industry experience, as Revision 2 of the EPRI report only requires ECP monitoring under HWC and HWC/noble metals chemical addition (NMCA) operation. NMP2 also takes an exception to monitoring ECP in accordance with Revision 0 of the EPRI report. NMP2 does not monitor ECP directly but monitors the molar ratio of hydrogen-to-oxygen as an acceptable alternative. This is also consistent with the latest industry experience as described in Revision 2 of the EPRI report.

The GALL text recommends that hydrogen peroxide be monitored to manage stress corrosion cracking and corrosion in BWR plants. Both NMP1 and NMP2 take exception to this since the accurate measurement of hydrogen peroxide is extremely difficult due to the rapid decomposition of this chemical in the sample lines. As an alternative, in conjunction with Revision 2 of the EPRI document, NMP1 measures ECP and NMP2 measures the molar ratio of hydrogen to oxygen.

Monitoring and Trending

EPRI TR-103515-R0 recommends that chlorides and sulfates in reactor water be sampled daily. NMP2 takes exception to this in that sampling for these chemical species occurs only 3 times per week. The justification for this exception is that these species are part of the conductivity measurement and, since conductivity is monitored continuously, any increase in conductivity above Action Level 1 requires daily sampling to determine the concentration of monitored species. This sampling plan is consistent with the guidance provided in Revisions 0 and 2 of the EPRI report.

EPRI TR-103515-R0 recommends that ECP be monitored continuously for reactor water. NMP2 takes exception to this in that ECP is not monitored and the molar ratio of hydrogen-to-oxygen is used as an acceptable alternative. BWRVIP-62 provides the technical correlation between these two parameters and establishes an operating goal for the value of hydrogen-to-oxygen molar ratio.

EPRI TR-103515-R0 recommends that the sampling frequencies and action levels for feedwater iron and copper commence at >10% power. Both NMP1 and NMP2 take exception to this guideline as these sampling activities do not commence until 25% power. The justification for this exception is that the filter samples collected below 25% power are not representative and the operating time between 10% and 25% power is short enough to be considered insignificant.

Acceptance Criteria

EPRI TR-103515-R0 recommends that an action level be established for ECP during power operations. NMP1 takes exception to the establishment of an action level but does establish an administrative goal that is the same value as the action level. The actions required by the NMP administrative procedure are consistent with the EPRI recommended actions for exceeding the value and, therefore, there is no impact on effectiveness of the program.

EPRI TR-103515-R0 recommends specific values for Action Levels 2 and 3 for reactor water chlorides and sulfates under HWC/NMCA conditions during power operations. NMP2 takes exception to these values by using the corresponding values recommended in Revision 2 of the EPRI report. The latest industry experience indicates that these higher values do not reduce the effectiveness of the water chemistry program while operating at power using HWC.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant specific operating experience relating to the Water Chemistry Control Program. As chemistry control guidelines were evolving in the industry, NMPNS experience with reactor water system chemistry was similar to that of the industry. Review of plant specific operating experience revealed DERs documenting instances where monitored parameters exceeded specified action levels or goals. In those instances where a chemistry action level was exceeded, prompt corrective actions were taken to re-establish proper chemistry.

The Water Chemistry Control Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Water Chemistry Control Program has been effective in mitigating corrosion in systems and components at NMPNS through continued application of widely used industry guidelines, which are updated as new information becomes available.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Water Chemistry Control Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.3 REACTOR HEAD CLOSURE STUDS PROGRAM

Program Description

The Reactor Head Closure Studs Program is an existing program that manages cracking of and loss of material from the reactor pressure vessel closure studs. The Reactor Head Closure Studs Program implements the preventive measures of Regulatory Guide 1.65. Inservice examinations are performed in accordance with the 1989 edition of the ASME Boiler and Pressure Vessel Code with no Addenda, and ASME Section XI, Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," 1995 Edition through 1996 Addenda as approved by the NRC in plant-specific exemptions (refer to Section B2.1.1).

NUREG-1801 Consistency

The Reactor Head Closure Studs Program takes exception to certain NUREG-1801, Section XI.M3 (Reactor Head Closure Studs) evaluation elements (Reference 2).

Exceptions to NUREG-1801

The program described in NUREG-1801, Section XI.M3, cites ASME Section XI requirements covered in the 1995 edition through the 1996 addenda. The IWB/C/D ISI programs for NMP1 and NMP2 are based on the 1989 edition with no addenda. This was found acceptable by the NRC in SERs dated October 5, 2000 (Enclosure to Reference 24) and March 3, 2000 (Enclosure to Reference 25), respectively.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Reactor Head Closure Studs Program. NMPNS reactor vessel studs have experienced very little degradation. A review of plant-specific operating experience revealed only a few DERs initiated as a result of inspections of the studs, associated nuts, and washers; these related to normal maintenance issues and did not identify age-related defects. There are no existing defects in the head studs or nuts.

Conclusion

The IWB/C/D ISI Program has been effective in managing aging of the reactor head closure studs.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the ISI Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.4 BWR VESSEL ID ATTACHMENT WELDS PROGRAM

Program Description

The BWR Vessel ID Attachment Welds Program is an existing program that manages the effects of cracking in reactor pressure vessel inside diameter attachment welds. The BWR Vessel ID Attachment Welds Program is based on industry guidelines issued by the BWR Vessel and Internals Project (BWRVIP) and approved by the NRC.

Implementation of the BWR Vessel ID Attachment Welds Program is discussed in the program description for the BWR Vessel Internals Program (Section B2.1.8).

The attributes of the BWR Vessel ID Attachment Welds Program related to maintaining reactor coolant water chemistry are discussed in the program description for the Water Chemistry Control Program (Section B2.1.2).

NUREG-1801 Consistency

The BWR Vessel ID Attachment Welds Program, as implemented by the programs listed above, is consistent with NUREG-1801, Section XI.M4 (BWR Vessel ID Attachment Welds) (Reference 2).

B2.1.5 BWR FEEDWATER NOZZLE PROGRAM

Program Description

The NMP1 and NMP2 Feedwater Nozzle Programs are existing programs that require UT inspections of the feedwater nozzles every 10 years to verify the nozzles are acceptable for continued service.

The NMP Feedwater Nozzle Programs are implemented through the Inservice Inspection (ISI) Program which, at the time the license renewal application was submitted, conformed to the requirements in American

Society of Mechanical Engineers (ASME) Code, Section XI, Subsection IWB, Table IWB 2500-1 (1989 Edition no Addenda), and ASME Section XI, Appendix VIII, 1995 Edition through 1996 Addenda, "Performance Demonstration for Ultrasonic Examination Systems," to ASME Section XI, Division 1.

UT and PT inspections required by NUREG-0619 have been superseded because the inspections are now performed in accordance with ASME Section XI, Appendix VIII.

NUREG-1801 Consistency

The NMP Feedwater Nozzle Programs are existing programs that satisfy the requirements of Section XI.M5, "BWR Feedwater Nozzle," of NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," U. S. NRC, April 2001 (Reference 2) with the one exception.

Exceptions to NUREG-1801

The exception to NUREG-1801, Section XI.M5, is that the NMP Inservice Inspection (ISI) Program does not comply with the specific Edition and Addenda of ASME Section XI cited in the GALL because the program is updated to the latest Edition and Addenda of ASME Section XI, as mandated by 10 CFR 50.55a, prior to the start of each inspection interval.

<u>Program Elements Affected</u>

Program Description

The exception is to the Program Description in NUREG-1801, Section XI.M5, and involves the edition of the ASME Code used as the basis for the Section XI requirements. NUREG-1801, Section XI.M5, identifies the 1995 edition (including the 1996 addenda) of ASME Section XI as the basis for the GALL feedwater nozzle program. The NMP1 and NMP2 Inservice Inspection (ISI) Programs will not comply with the Edition and Addenda of ASME Section XI cited in the GALL because the programs are updated to the latest Edition and Addenda of ASME Section XI, as mandated by 10 CFR 50.55a, prior to the start of each inspection interval. This exception (i.e., updating the ISI Program to the latest Edition and Addenda of ASME Section XI, as mandated by 10 CFR 50.55a) is acceptable because the NMP ISI programs meet the intent of NUREG-1801, Section XI.M5, in that the feedwater nozzles are subject to ASME Section XI requirements.

The basis for the acceptability of using ASME Section XI requirements based on the 1989 edition with no addenda, and ASME Section XI Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," to ASME Section XI, Division 1, 1995 Edition with the 1996 Addenda, is described in Section B2.1.1.

Enhancements

None

Operating Experience

No industry experience was identified that indicates that existing programs and practices will not be effective in the timely identification of feedwater nozzle cracking.

Conclusion

The existing NMP1 and NMP2 Feedwater Nozzle Programs, which require an ultrasonic examination every 10 years, provides a high degree of assurance that feedwater nozzle cracks will be detected prior to exceeding the ASME Section XI allowable values. The basis for this conclusion is that ultrasonic examinations of feedwater nozzles performed during refueling outages using automated test equipment qualified in accordance with Appendix VIII to ASME Section XI, Division 1, 1995 Edition with the 1996 Addenda, did not identify any existing indications. The combination of the most recent inspection results and the requirement to perform additional ultrasonic examinations at a minimum 10 year frequency constitute a comprehensive program for monitoring the Feedwater nozzle.

B2.1.6 BWR STRESS CORROSION CRACKING PROGRAM

Program Description

The BWR Stress Corrosion Cracking (SCC) Program manages intergranular stress corrosion cracking in reactor coolant pressure boundary piping made of stainless steel as delineated in NUREG-0313, Revision 2, and Generic Letter 88-01 and its Supplement 1, as modified by BWRVIP-75. Augmented inspections are performed in accordance with these documents.

The attributes of the BWR SCC Program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program (Section B2.1.2).

NUREG-1801 Consistency

The BWR SCC Program takes exception to certain NUREG-1801, Section XI.M7 (BWR SCC) evaluation elements (Reference 2).

Exceptions to NUREG-1801

The program described in NUREG-1801, Section XI.M7, cites ASME Section XI requirements covered in the 1995 edition through the 1996 addenda for the evaluation of any detected indication. The AMSE Section XI programs for NMP1 and NMP2 are based on the 1989 edition with no addenda. This was found acceptable by the NRC in SERs dated October 5, 2000 (Enclosure to Reference 24) and March 3, 2000 (Enclosure to Reference 25), respectively.

Program Elements Affected

Acceptance Criteria

Evaluation activities are implemented in accordance with the ASME Section XI program plans submitted to the NRC as identified in the SERs listed in (1), above.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to BWR stress corrosion cracking. Along with other plants in the BWR fleet, NMPNS has found indications of IGSCC in recirculation system piping and welds that were evaluated and dispositioned in accordance with the applicable ISI Program plan.

The plant continuously reviews industry operating experience to determine its applicability to NMPNS and adjusts inspection plans accordingly. Plant-specific operating experience is reviewed and trended; findings are documented, reviewed, and resolved; corrective actions are taken; and mitigative actions to limit aging initiated.

Conclusion

The BWR SCC Program has been effective in managing intergranular stress corrosion cracking.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the BWR SCC Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.7 BWR PENETRATIONS PROGRAM

Program Description

The BWR Penetrations Program is an existing program that manages the effects of cracking in the various penetrations of the reactor pressure vessels at NMPNS. The BWR Penetrations Program is based on guidelines issued by the BWR Vessel and Internals Project (BWRVIP) and approved by the NRC.

Implementation of the BWR Penetrations Program is discussed in the program description for the BWR Vessel Internals Program (Section B2.1.8).

The attributes of the BWR Penetrations Program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program (Section B2.1.2).

NUREG-1801 Consistency

The BWR Penetrations Program, as implemented by the programs listed above, is consistent with NUREG-1801, Section XI.M8 (BWR Penetrations) (Reference 2).

B2.1.8 BWR VESSEL INTERNALS PROGRAM

Program Description

The BWR Vessel Internals Program is an existing program that manages aging of materials inside the reactor vessel. Program activities include (1) inspections for the presence and effects of cracking; and (2) monitoring and control of water chemistry. This program is based on guidelines issued by the BWR Vessel and Internals Project (BWRVIP) and approved (or pending approval[1]) by the NRC. The attributes of the BWR Vessel Internals Program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program (Section B2.1.2).

Inspections and evaluations of reactor vessel components are consistent with the guidelines provided in the following BWRVIP reports:

BWRVIP-18, BWR Core Spray Internals Inspection and Flaw Evaluation Guidelines
BWRVIP-25, BWR Core Plate Inspection and Flaw Evaluation Guidelines
BWRVIP-26, BWR Top Guide Inspection and Flaw Evaluation Guidelines
BWRVIP-27, BWR Standby Liquid Control System/Core Plate ΔP Inspection and Flaw Evaluation Guidelines
BWRVIP-38, BWR Shroud Support Inspection and Flaw Evaluation Guidelines
BWRVIP-41, BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines (NMP2 only)
BWRVIP-42, LPCI Coupling Inspection and Flaw Evaluation Guidelines (NMP2 only)
BWRVIP-47, BWR Lower Plenum Inspection and Flaw Evaluation Guidelines
BWRVIP-48, Vessel ID Attachment Weld Inspection and Flaw Evaluation Guidelines
BWRVIP-49, Instrument Penetration Inspection and Flaw Evaluation Guidelines
BWRVIP-74, BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines
BWRVIP-76, BWR Core Shroud Inspection and Flaw Evaluation Guidelines

The following table addresses the license renewal applicant action items identified in the corresponding NRC safety evaluation (SE) for each of the listed BWRVIP reports. BWRVIP-76 is not included in the table as it has not received NRC review and approval to date. Each of the NRC SEs includes three common applicant action items. The NMPNS response to each common action item is the same and is addressed only once in the following table. For those SEs which contained additional applicant action items, the NMPNS response is provided separately following the responses to the three common items.

BWRVIP License Renewal Applicant Action Items

Action Item Description	NMPNS Response
Common Action Items	
BWRVIP-All (1) The license renewal applicant is to verify that its plant is bounded by the report. Further, the renewal applicant is to commit to programs described as necessary in the BWRVIP reports to manage the effects of aging during the period of extended operation. Applicants for license renewal will be responsible for describing any such commitments and identifying how such commitments will be controlled. Any deviations from the aging management programs within these BWRVIP reports described as necessary to manage the effects of aging during the period of extended operation and to maintain the functionality of the components or other information presented in the report, such as materials of construction, will have to be identified by the renewal applicant and evaluated on a plant-specific basis in accordance with 10 CFR 54.21(a)(3) and (c)(1).	NMPNS has reviewed each BWRVIP report and verified that NMP1 and NMP2 are bounded by the reports. Additionally, NMPNS commits to programs described as necessary in the BWRVIP reports to manage the effects of aging during the period of extended operation. These commitments are described by reference to the applicable BWRVIP report in Appendix A of the LRA, FSAR Supplement, and administratively controlled in accordance with the guidelines of BWRVIP-94. Any deviation from a BWRVIP report approved by the NRC will be reported to the NRC within 45 days of the NRC approval.
BWRVIP-All (2) 10 CFR 54.21(d) requires that an FSAR supplement for the facility contain a summary description of the programs and activities for managing the effects of aging and the evaluation of TLAAs for the period of extended operation. Those applicants for license renewal referencing the applicable BWRVIP report shall ensure that the programs and activities specified as necessary in the applicable BWRVIP reports are summarily described in the FSAR supplement.	The FSAR Supplements for NMP1 and NMP2 are included as Appendix A of the LRA and include a summary of the programs and activities specified as necessary for the BWRVIP program.

Action Item Description	NMPNS Response
BWRVIP-All (3) 10 CFR 54.22 requires that each application for license renewal include any technical specification changes (and the justification for the changes) or additions necessary to manage the effects of aging during the period of extended operation as part of the renewal application. The applicable BWRVIP reports may state that there are no generic changes or additions to technical specifications associated with the report as a result of its aging management review and that the applicant will provide the justification for plant-specific changes or additions. Those applicants for license renewal referencing the applicable BWRVIP reports shall ensure that the inspection strategy described in the reports does not conflict with or result in any changes to their technical specifications. If technical specification changes or additions do result, then the applicant must ensure that those changes are included in its application for license renewal.	There have been no technical specification changes identified for NMP1 or NMP2 based upon the BWRVIP reports.
Additional Action Items	
BWRVIP-18 (4) Applicants referencing the BWRVIP-18 report for license renewal should identify and evaluate any potential TLAA issues which may impact the structural integrity of the subject RPV internal components.	There were no TLAA issues identified for NMP1 for BWRVIP-18. For NMP2, the Core Spray Sparger was identified as a TLAA issue and is included in Section 4.3.5 of the LRA, Reactor Vessel Internals Fatigue Analysis.
BWRVIP-25 (4) Due to susceptibility of the rim hold-down bolts to stress relaxation, applicants referencing the BWRVIP-25 report for license renewal should identify and evaluate the projected stress relaxation as a potential TLAA issue.	This issue is not applicable to NMP1 as it has core plate wedges installed. For NMP2, the TLAA addressing this issue is described in Section 4.7.3 of the LRA, Stress Relaxation of Core Plate Hold-Down Bolts.
BWRVIP-25 (5) Until such time as an expanded technical basis for not inspecting the rim hold-down bolts is approved by the staff, applicants referencing the BWRVIP-25 report for license renewal should continue to perform inspections of the rim hold-down bolts.	This issue is not applicable to NMP1 as it has core plate wedges installed. For NMP2, inspections of the core plate rim hold-down bolts will continue until such time that an NRC-approved technical basis is issued.

Action Item Description	NMPNS Response
BWRVIP-26 (4) Due to IASCC susceptibility of the subject safety-related components, applicants referencing the BWRVIP-26 report for license renewal should identify and evaluate the projected accumulated neutron fluence as a potential TLAA issue.	NMPNS has concluded that both NMP1 and NMP2 have exceeded the neutron fluence threshold for IASCC susceptibility for the top guide. As such, the top guide grid beam inspections recommended in GE Service Information Letter (SIL) 554 have been incorporated into the BWRVIP Inspection Plans for both units. NMP1 has completed the first inspections, and NMP2 will perform the first inspections during its next refueling outage. Therefore, evaluating the projected accumulated neutron fluence as a potential TLAA is considered unwarranted.
BWRVIP-27 (4) Due to the susceptibility of the subject components to fatigue, applicants referencing the BWRVIP- 27 report for license renewal should identify and evaluate the projected fatigue cumulative usage factors as a potential TLAA issue.	There were no TLAA issues identified for NMP1 for BWRVIP-27. For NMP2, the Standby Liquid Control System/ Core Plate dP line was identified as a TLAA issue and is included in Section 4.3.5 of the LRA, Reactor Vessel Internals Fatigue Analysis.
BWRVIP-42 (4) Applicants referencing the BWRVIP-42 report for license renewal should identify and evaluate any potential TLAA issues which may impact the structural integrity of the subject RPV internal components.	This issue is not applicable for NMP1 as it is a BWR/2 design and does not have a low pressure coolant injection (LPCI) line. For NMP2, the LPCI line was identified as a TLAA issue and is included in Section 4.3.1 of the LRA, Reactor Vessel Fatigue Analysis.
BWRVIP-42 (5) The BWRVIP committed to address development of the technology to inspect inaccessible welds and to have the individual LR applicant notify the NRC of actions planned. Applicants referencing BWRVIP-42 report for license renewal should identify the action as open and to be addressed once the BWRVIP's response to this issue has been reviewed and accepted by the staff.	This issue is not applicable to NMP1 as it is a BWR/2 design and does not have a LPCI line. The inspection of inaccessible welds is a generic open action. NMP2 will address this issue once the BWRVIP's response has been reviewed and accepted by the NRC.

Action Item Description	NMPNS Response
BWRVIP-47 (4) Due to fatigue of the subject safety-related components, applicants referencing the BWRVIP-47 report for LR should identify and evaluate the projected CUF as a potential TLAA issue.	There were no TLAA issues identified for NMP1 for BWRVIP-47. For NMP2, TLAA issues for components addressed in BWRVIP-47 are included in LRA Section 4.3.1, Reactor Vessel Fatigue Analysis, and Section 4.3.5, Reactor Vessel Internals Fatigue Analysis.
BWRVIP-74-A (4) The staff is concerned that leakage around the reactor vessel seal rings could accumulate in the VFLD lines, cause an increase in the concentration of contaminants and cause cracking in the VFLD line. The BWRVIP-74 report does not identify this component as within the scope of the report. However, since the VFLD line is attached to the RPV and provides a pressure boundary function, LR applicants should identify an AMP for the VFLD line.	The VFLD lines are in-scope and have cracking identified as an aging effect requiring management. They are managed by the One-Time Inspection, Water Chemistry and ASME Section XI programs.
BWRVIP-74-A (5) LR applicants shall describe how each plant-specific aging management program addresses the following elements: (1) scope of program, (2) preventative actions, (3) parameters monitored and inspected, (4) detection of aging effects, (5) monitoring and trending, (6) acceptance criteria, (7) corrective actions, (8) confirmation process, (9) administrative controls, and (10) operating experience.	The Systems Walkdown Program is the only plant-specific aging management program credited for managing aging of the reactor pressure vessels (credited for the NMP2 VFLD line). The assessment of all 10 aging attributes for this AMP is addressed in LRA Section B2.1.33.
BWRVIP-74-A (6) The staff believes inspection by itself is not sufficient to manage cracking. Cracking can be managed by a program that includes inspection and water chemistry. BWRVIP-29 describes a water chemistry program that contains monitoring and control guidelines for BWR water that is acceptable to the staff. BWRVIP-29 is not discussed in the BWRVIP-74 report. Therefore, in addition to the previously discussed BWRVIP reports, LR applicants shall contain water chemistry programs based on monitoring and control guidelines for reactor water chemistry that are contained in BWRVIP-29.	NMPNS maintains a Water Chemistry Control Program for NMP1 and NMP2 as described in LRA Section B2.1.2.

Action Item Description	NMPNS Response
BWRVIP-74-A (7) LR applicants shall identify their vessel surveillance program, which is either an ISP or plant-specific in-vessel surveillance program, applicable to the LR term.	The Reactor Vessel Surveillance Program for NMP1 and NMP2 will be an Integrated Surveillance Program for the license renewal term, as described is Section B2.1.19 of the LRA.
BWRVIP-74-A (8) LR applicants should verify that the number of cycles assumed in the original fatigue design is conservative to assure that the estimated fatigue usage for 60 years of plant operation is not underestimated. The use of alternative actions for cases where the estimated fatigue usage is projected to exceed 1.0 will require case by case staff review and approval. Further, a LR applicant must address environmental fatigue for the components listed in the BWRVIP-74 report for the LR period.	Thermal fatigue (including discussions of cycles, projected cumulative usage factors, environmental fatigue, etc.) is evaluated as a TLAA and described in Section 4.3 of the LRA.
BWRVIP-74-A (9) Appendix A to the BWRVIP-74 report indicates that a set of P-T curves should be developed for the heatup and cooldown operating conditions in the plant at a given EFPY in the LR period.	The development of P-T curves for NMP1 and NMP2 for the license renewal period is described as a TLAA in Section 4.2.2 of the LRA.
BWRVIP-74-A (10) To demonstrate that the beltline materials meet the Charpy USE criteria specified in Appendix B of the report, the applicant shall demonstrate that the percent reduction in Charpy USE for their beltline materials are less than those specified for the limiting BWR/3-6 plates and the non-Linde 80 submerged arc welds and that the percent reduction in Charpy USE for their surveillance weld and plate are less than or equal to the values projected using the methodology in RG 1.99, Revision 2.	The discussion of Charpy upper shelf energy (USE) for NMP1 and NMP2 for the license renewal period is described as a TLAA in Section 4.2.1 of the LRA. NMP1 has utilized an Equivalent Margin Analysis to confirm acceptability of the USE for the license renewal period, whereas NMP2 has utilized the RG 1.99, Revision 2, methodology.

Action Item Description	NMPNS Response
BWRVIP-74-A (11) To obtain relief from the inservice inspection of the circumferential welds during the LR period, the BWRVIP report indicates each licensee will have to demonstrate that (1) at the end of the renewal period, the circumferential welds will satisfy the limiting conditional failure frequency for circumferential welds in the Appendix E for the staff's July 28, 1998, FSER, and (2) that they have implemented operator training and established procedures that limit the frequency of cold overpressure events to the amount specified in the staff's FSER.	The discussion of relief from the inservice inspection of the circumferential welds for NMP1 for the license renewal period is described in Section 4.2.3 of the LRA. For NMP2, this relief has not been sought for the current operating term. Therefore, this item is not applicable.
BWRVIP-74-A (12) As indicated in the staff's March 7, 2000, letter to Carl Terry, a LR applicant shall monitor axial beltline weld embrittlement. One acceptable method is to determine that the mean RT_{NDT} of the limiting axial beltline weld at the end of the period of extended operation is less than the values specified in Table 1 of this FSER.	The discussion of RPV axial weld failure probability for NMP1 and NMP2 for the license renewal period is described in Section 4.2.4 of the LRA.
BWRVIP-74-A (13) The Charpy USE, P-T limit, circumferential weld and axial weld RPV integrity evaluations are all dependent upon the neutron fluence. The applicant may perform neutron fluence calculations using staff approved methodology or may submit the methodology for staff review. If the applicant performs the neutron fluence calculation using a methodology previously approved by the staff, the applicant should identify the NRC letter that approved the methodology.	The neutron fluence calculational methodology for NMP1 and NMP2 is consistent with RG 1.190. The NRC approved this plant-specific methodology in a letter dated October 27, 2003.
BWRVIP-74-A (14) Components that have indications that have been previously analytically evaluated in accordance with sub-section IWB-3600 of Section XI to the ASME Code until the end of the 40-year service period shall be re-evaluated for the 60-year service period corresponding to the LR term.	NMP1 has performed flaw evaluations for previously identified indications. These are discussed in Section 4.7.4 of the LRA. This is not applicable to NMP2 as no indications have been previously identified.

NUREG-1801 Consistency

The BWR Vessel Internals Program is an existing program that is consistent with NUREG-1801, Section XI.M9 (BWR Vessel Internals) (Reference 2). After enhancement, it will also be consistent with the latest industry and regulatory License Renewal precedence.

Exceptions to NUREG-1801

None

Enhancements

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

Program Elements Affected

Parameters Monitored/Inspected:

- Maintenance procedures for the inspection of the Orificed Fuel Support (OFS) casting will be enhanced to include a sample VT-1 inspection of the casting and an EVT-1 inspection if any evidence of impact or mishandling is identified.

Detection of Aging Effects:

- BWRVIP-18, BWRVIP-41, and BWRVIP-42 identify open items regarding the inspection of inaccessible welds for core spray, jet pump, and low pressure coolant injection (LPCI) components, respectively. As such, NMPNS will implement the resolution of these open items as documented in the BWRVIP response and reviewed and accepted by the NRC. These three open items are applicable to NMP2. For NMP1, only the open item for core spray components is applicable due to the design of the plant.

- The inspection and evaluation guidelines for steam dryers are currently under development by the BWRVIP committee. Once these guidelines are documented, and reviewed and accepted by the NRC, the actions will be implemented at NMP1 and NMP2 in accordance with the BWRVIP program.

- The inspection and evaluation guidelines for access hole covers are currently under development by the BWRVIP committee. Once these guidelines are documented, and reviewed and accepted by the NRC, the actions will be implemented at NMP2 in accordance with the BWRVIP program. This issue is not applicable to NMP1 due to the design of the plant."

- The baseline inspections recommended in BWRVIP-47 for the BWR lower plenum components will be incorporated into the appropriate program and implementing documents.

- A schedule for additional inspections of the top guide locations (using EVT-1 or techniques demonstrated to be appropriate in BWRVIP-03) will be incorporated into the appropriate program and implementing documents. A minimum of 10% of the locations will be inspected within 12 years of the beginning of the period of extended operation, with at least 5% of the inspections completed within 6 years.

Corrective Action:

- NMP will follow the status of the proposed ASME Code change with respect to allowing roll/expansion techniques of CRD stub tubes, and will implement the final code change or provide an alternative plan for the NMP1 period of extended operation. This will be accomplished at least 1 year prior to the expiration of the current operating license.

Enhancements will be completed prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the BWR Vessel Internals Program. Review of plant-specific operating experience revealed conditions discovered by BWR Vessel Internals Program examinations similar to those identified elsewhere in the BWR fleet. In each case, indications were evaluated and either found acceptable for further service or appropriately repaired.

The BWR Vessel Internals Program is continually adjusted to account for industry experience and research (including activities of the BWRVIP and ASME Section XI Code Committees). In 2001, the Institute of Nuclear Power Operations (INPO) conducted a review of activities related to BWR Vessel Internals Program at NMP2. Several strengths were identified, and recommendations for improvement were addressed by program upgrades at NMP1 and NMP2. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The BWR Vessel Internals Program has been effective in managing aging effects, ensuring timely detection, evaluation, and appropriate corrective action to address degradation of reactor pressure vessel components and internals.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the BWR Vessel Internals Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.9 FLOW-ACCELERATED CORROSION PROGRAM

Program Description

The Flow-Accelerated Corrosion (FAC) Program (also referred to as the Erosion/Corrosion Program at NMPNS) is an existing program that manages aging effects due to flow-accelerated corrosion in carbon steel and low alloy steel piping containing single-phase and two-phase high-energy fluids. Program activities include (1) analysis using a predictive code (CHECWORKS) to determine critical locations, (2) baseline inspections to determine the extent of thinning at the selected locations, (3) follow-up inspections to confirm the predictions, and (4) repair or replacement of components, as necessary. The inspection results provide input to the predictive computer code to calculate the number of refueling or operating cycles remaining before the component reaches the minimum allowable wall thickness. If the component trend indicates that an area will reach the minimum allowed thickness before the next scheduled outage, the component is repaired, replaced, or re-evaluated. The program considers the recommended actions in NRC Bulletin 87-01 and Information Notice 91-18, and implements the guidelines for an effective FAC program presented in EPRI Report NSAC-202L-R2 (Reference 5). The program also implements the recommendations provided in NRC Generic Letter (GL) 89-08, *Erosion/Corrosion Induced Pipe Wall Thinning.*

NUREG-1801 Consistency

The FAC Program is an existing program that is consistent with NUREG-1801, Section XI.M17 (Flow-Accelerated Corrosion) (Reference 2), as modified by current regulatory guidance regarding NSAC-202L-R2 (Reference 5).

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

Wall thinning problems in single- and two-phase systems have occurred throughout the industry, as documented in various NRC Bulletins and Information Notices. NMPNS reviewed both industry and plant-specific operating experience in establishing the basis for the FAC Program, which is continually adjusted to account for further industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The FAC Program has been effective in managing the aging effects of flow-accelerated corrosion.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the FAC Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.10 OPEN-CYCLE COOLING WATER SYSTEM PROGRAM

Program Description

The Open-Cycle Cooling Water System (OCCWS) Program is an existing program that manages aging of components exposed to raw, untreated (e.g., service) water. For NMP 1 this includes portions of the Service Water (SW) system associated with the emergency SW pumps internal components of the Reactor Building Closed Loop Cooling (RBCLC) heat exchangers; the raw cooling water portions of the emergency Diesel Generator (DG) and Containment Spray (CTN-SP) systems portions of the Circulating Water (CW) system required to support the raw water supply; as well as other components WSLR wetted by SW that are credited in the aging management review. The NMP 2 OCCWS scope includes a portion of the Alternate Decay Heat (ADH) system with associated portions of the Service Water (SWP) system, the Residual Heat Removal (RHS) heat exchangers, Diesel Generator (EGS) jacket water coolers, and Control Room Chillers (HVK).

Also included are components WSLR that are wetted by the SWP system and credited in the aging management review.

Program activities include (a) surveillance and control of biofouling (including biocide injection), (b) verification of heat transfer capabilities for components cooled by the Service Water System, (c) inspection and maintenance, (d) walkdown inspections, and (e) review of maintenance, operating and training practices and procedures. Inspections may include visual, UT, and Eddy Current Testing (ECT) methods. The OCCWS Program is based on the recommendations of GL 89-13.

NUREG-1801 Consistency

The OCCWS Program is an existing program that, when enhanced, will be consistent with NUREG-1801, Section XI.M20 (Open-Cycle Cooling Water System) (Reference 2).

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the Open Cycle Cooling Water Program encompass revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Scope of Program:

- Ensure that the applicable NMP 1 commitments made for GL 89-13, and the requirements in NUREG-1801, Section XI.M20 are captured in the NMP 1 implementing documents for GL 89-13.

- Ensure that the applicable NMP 2 commitments made for GL 89-13, and the requirements in NUREG-1801, Section XI.M20 are captured in N2-TDP-REL-0104, "GL 89-13, Service Water System Problems Affecting Safety Related Equipment Program Plan."

- Where the requirements of the NUREG-1801, Section XI.M20 are more conservative than the GL 89-13 commitments, they will be incorporated into the OCCWS program.

Acceptance Criteria:

- Revise the NMP 1 and NMP 2 preventive maintenance and heat transfer performance test procedures to incorporate specific inspection criteria, corrective actions, and frequencies.

Enhancements will be completed prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the OCCWS Program. Inspections implementing the guidance of GL 89-13 have identified deterioration (including pipe wall thinning, pinhole leakage, and microbiologically-influenced corrosion) and degradation (including clogged lines, flow restrictions, and fouling). These deficiencies were documented in DERs and resulted in cleaning, repair, or replacement of the affected components prior to loss of system function.

The OCCWS Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The OCCWS Program has been effective in managing aging effects, including erosion and corrosion, blockage due to silt buildup, microbiological growth, and zebra mussel growth, and leaks due to corrosion and microbiologically-influenced corrosion. The enhancements discussed above will improve program effectiveness.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the OCCWS Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.11 CLOSED-CYCLE COOLING WATER SYSTEM PROGRAM

Program Description

The Closed-Cycle Cooling Water System (CCCWS) Program is an existing program that manages loss of material and fouling of components exposed to closed-cycle cooling water environments. The applicable piping systems at NMPNS include the NMP1 and NMP2 Reactor Building Closed Loop Cooling Systems, NMP1 Control Room HVAC System, the NMP2 Control Building Ventilation Chilled Water System, the heat exchanger jacket water cooling portions of the NMP1 Emergency Diesel Generator System and the NMP2 Standby Diesel Generator Protection (Generator) System. Program activities include chemistry monitoring, surveillance testing, data trending, and component inspections. The CCCWS Program implements the guidelines for controlling system performance and aging effects described in EPRI Report TR-107396 (Reference 6).

NUREG-1801 Consistency

The CCCWS Program is an existing program that will be consistent with NUREG-1801, Section XI.M21 (Closed-Cycle Cooling Water System) (Reference 2), after enhancements are incorporated.

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the CCCWS Program encompass revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Preventive Actions

- Expand periodic chemistry checks of CCCW Systems consistent with the guidelines of EPRI TR-107396 (Reference 6).

- Implement a program to use corrosion inhibitors in the NMP 1 and NMP 2 Reactor Building Closed Loop Cooling Systems, NMP 1 Control Room HVAC System, and NMP 2 Control Building Ventilation Chilled Water System in accordance with the guidelines given in EPRI TR-107396.

Parameters Monitored/Inspected, Detection of Aging Effects

- Direct periodic inspections to monitor for loss of material in the piping of the CCCW systems
- Implement a corrosion monitoring program for larger bore CCCW piping not subject to inspection under another program at NMP1.

Monitoring and Trending

- Establish the frequencies to inspect for degradation of components in CCCW Systems, including heat exchanger tube wall thinning.
- Perform a heat removal capability test for the NMP 1 Control Room HVAC System at least every 5 years.
- Establish periodic monitoring, trending, and evaluation of performance parameters for the NMP 1 and NMP 2 Reactor Building Closed Loop Cooling, NMP 1 Control Room HVAC, and NMP 2 Control Building Ventilation Chilled Water systems.
- Specify chemistry sampling frequency for the NMP2 Control Building Ventilation Chilled Water System.

Acceptance Criteria

- Provide the controls and sampling necessary to maintain water chemistry parameters in CCCW Systems within the guidelines of EPRI Report TR-107396 (Reference 6).
- Ensure acceptance criteria are specified in the implementing procedures for the applicable indications of degradation

Enhancements will be completed prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the CCCWS Program. Review of plant-specific operating experience revealed various forms of degradation that were discovered by CCCWS Program activities at NMPNS. Corrective actions for observed degradation included increased monitoring, component repair, or component replacement as deemed necessary. Periodic monitoring of CCCW Systems assures that any worsening trends are identified and the capabilities of CCCWS components WSLR are maintained.

The CCCWS Program at NMPNS is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The CCCWS Program has been effective in managing aging effects, including corrosion and fouling of heat transfer surfaces in CCCW Systems. Implementing the guidelines of EPRI Report TR-107396, as indicated above, will enhance program effectiveness.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the CCCWS Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.12 BORAFLEX MONITORING PROGRAM (NMP1 ONLY)

Program Description

The Boraflex Monitoring Program is an existing program that manages degradation of neutron absorbing material in spent fuel pool storage racks resulting from radiation exposure and possible water ingress. Program activities include (1) inspection of the NMP1 test coupons to detect dimensional changes (2) correlation of measured levels of silica in the spent fuel pool with analysis using a predictive code (e.g., RACKLIFE) to estimate boron loss from Boraflex panels; and (3) neutron attenuation testing to measure the boron areal density of the short-length test coupons. The Boraflex Monitoring Program for NMP1 will be enhanced to require periodic in-situ neutron attenuation testing and measurement of boron areal density to confirm the correlation of the conditions of test coupons to those of Boraflex racks that remain in use during the period of extended operation. This enhancement will be implemented prior to the period of extended operation.

NUREG-1801 Consistency

The Boraflex Monitoring Program is an existing program that, upon enhancement, will be consistent with the ten elements of Aging Management Program XI.M22, "Boraflex Monitoring," specified in NUREG-1801. (Reference 2).

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the Boraflex Monitoring Program for NMP1 include performance of periodic neutron attenuation testing and measurement of boron areal density to confirm the correlation of the conditions of the test coupons to the conditions of the Boraflex racks that remain in use during the period of extended operation.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Preventive Actions, Parameters Monitored/Inspected, Detection of Aging Effects

- Provide direction for periodic performance of neutron attenuation testing and measurement of boron areal density to confirm the correlation of the conditions of the test coupons to the conditions of the Boraflex racks that remain in use during the period of extended operation.

Enhancements will be completed prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Boraflex Monitoring Program. Plant-specific operating experience at NMPNS is related to testing of surveillance coupons, whose results indicate expected levels of degradation. Review of plant-specific operating experience revealed the following additional conditions that were discovered by Boraflex Monitoring Program activities in 2002:

- When the results of chemistry analysis indicated silica levels in the NMP1 spent fuel pool slightly greater than the established criteria for plant operation, a DER was initiated. A technical evaluation determined that actual silica levels were acceptable and the operating range was revised accordingly.

The Boraflex Monitoring Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Boraflex Monitoring Program has been effective in managing aging effects, including loss of boron carbide from Boraflex panels. Implementing the enhancements identified above will upgrade program effectiveness for NMP1.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Boraflex Monitoring Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.13 INSPECTION OF OVERHEAD HEAVY LOAD AND LIGHT LOAD HANDLING SYSTEMS PROGRAM

Program Description

The Inspection of Overhead Heavy Load and Light Load Handling Systems Program (referred to herein as the Crane Inspection Program) is an existing program that manages loss of material due to corrosion of cranes WSLR. Program activities include (1) performance of various maintenance activities on a specified frequency; and (2) pre-operational inspections of equipment prior to lifting activities. Crane inspection activities are based on the mandatory requirements of applicable industry standards and implement the guidance of NUREG-0612 (Reference 15).

NUREG-1801 Consistency

The Crane Inspection Program is an existing program that will be consistent with NUREG-1801, Section XI.M23 (Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems) (Reference 2), after enhancements are incorporated.

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the Crane Inspection Program encompass revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Parameters Monitored/Inspected, Detection of Aging Effects

Add specific direction for performance of pre-lift corrosion inspections, with acceptance criteria, for certain hoist lifting assembly components.

Enhancements will be completed prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Crane Inspection Program. Review of plant-specific operating experience revealed no failures caused by loss of material in crane structural components. The Crane Inspection Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Crane Inspection Program has been effective in managing corrosion of SSCs associated with load handling at NMPNS.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Crane Inspection Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.14 COMPRESSED AIR MONITORING PROGRAM (NMP1 ONLY)

Program Description

The Compressed Air Monitoring Program is an existing program that manages aging effects for portions of the Compressed Air Systems WSLR, including cracking and loss of material due to general corrosion, by controlling the internal environment of systems and components. Program activities include air quality checks at various locations to detect contaminants that would affect the system's intended function. Additional visual inspections are credited for identification and monitoring of degradation for air compressors, receivers, and air dryers. The Compressed Air Monitoring Program is based on GL 88-14 and recommendations presented in INPO Significant Operating Event Report 88-01.

The Compressed Air Monitoring Program is only applicable to NMP1 since the components requiring aging management for the NMP2 Compressed Air System are managed under the 10 CFR 50 Appendix J Program and the One-Time Inspection Program.

NUREG-1801 Consistency

The Compressed Air Monitoring Program is an existing program that will be consistent with NUREG-1801, Section XI.M24 (Compressed Air Monitoring) (Reference 2), after enhancements are incorporated.

Exceptions to NUREG-1801

The program described in NUREG-1801, Section XI.M24, cites the guidance contained in EPRI TR-108147 and ASME OM-S/G-1998, Part 17, regarding maintenance and inspection activities for instrument air system equipment. The NMP1 Compressed Air Monitoring Program includes good practice elements of the general maintenance and inspection activities for the compressor, receiver, and air drier discussed in EPRI TR-108147 (revision to EPRI NP-7079) and ASME OM-S/G-1998, Part 17. However, specific exception is taken to any maintenance recommended in EPRI TR-108147 that is not also endorsed by the equipment manufacturers, and to the preservice and inservice testing guidelines of ASME OM-S/G-1998, Part 17. The justification for these exceptions is that there have been no age-related failures in this system under the current program.

Enhancements

Enhancements to the Compressed Air Monitoring Program encompass revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Scope, Preventive Action, Detection of Aging Effects

- Develop new activities to manage the loss of material, stress corrosion cracking, and perform periodic system leak checks.

- Expand the scope, periodicity, and inspection techniques to ensure that the aging of certain sub-components of the dryers and compressors (e.g., valves, heat exchangers) are managed.
- Develop and implement activities to address the failure mechanism of stress corrosion cracking in unannealed red brass piping.

Monitoring and Trending

Establish activities that manage the aging of the internal surfaces of carbon steel piping and that require system leak checks to detect deterioration of the pressure boundaries.

Acceptance Criteria

Expand the acceptance criteria to ensure that the aging of certain sub-components of the dryers and compressors (e.g., valves, heat exchangers) are managed.

Enhancements will be completed prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Compressed Air Monitoring Program. Since its inception in 1992, the Compressed Air Monitoring Program at NMPNS has effectively detected the buildup of corrosion products and prevented component failure. NMP1 has experienced age related degradation due to stress corrosion cracking in unannealed red brass piping in areas that may have been chemically contaimated. However, no pneumatic component WSLR has experienced a loss of intended function due to corrosion, corrosion product buildup, or dirt buildup in the instrument air system. The Compressed Air Monitoring Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Compressed Air Monitoring Program has been effective in preventing degraded air quality and the resultant general corrosion from affecting system performance.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Compressed Air Monitoring Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.15 BWR REACTOR WATER CLEANUP SYSTEM PROGRAM

Program Description

The BWR Reactor Water Cleanup System Program manages the effects of stress corrosion cracking (SCC) or intergranular stress corrosion cracking (IGSCC) on the intended function of austenitic stainless steel piping in the Reactor Water Cleanup System. This program is based on the NRC criteria related to inspection guidelines for RWCU piping welds outboard of the containment isolation valve as delineated in NUREG-0313, Revision 2, and Generic Letter (GL) 88-01. An exception is taken to the Acceptance Criteria program element in that NMP1 utilizes the 1989 edition with no addenda of the ASME Section XI code versus the 1995 edition through the 1996 addenda as defined in the GALL. The design of the NMP2 RWCU system is such that carbon steel piping welds are not required to be examined in accordance with GL 88-01.

The attributes of the BWR Reactor Water Cleanup System Program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program (Section B2.1.2)

NUREG-1801 Consistency

The BWR Reactor Water Cleanup System Program for NMP1 takes exception to one NUREG-1801, Section XI.M25 (BWR Reactor Water Cleanup System) evaluation element (Reference 2).

(1) The program described in NUREG-1801, Section XI.M25, cites ASME Section XI requirements covered in the 1995 edition through the 1996 addenda for the Acceptance Criteria element. NMP1 utilizes the 1989 edition with no addenda. This was found acceptable by the NRC in SERs dated NRC in an SER dated October 5, 2000 (Enclosure to Reference 24).

Program Elements Affected

Acceptance Criteria

Evaluation activities are implemented in accordance with the ASME Section XI program plan submitted to the NRC as identified in the SER listed in (1), above.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to cracking in the Reactor Water Cleanup System. Review of plant-specific operating experience for NMP1 identified that leaks were experienced in two welds outboard of the second isolation valve. Weld 33-FW-22 had undergone a localized repair during its original construction and consequently, became more sensitized. Weld 33-FW-23A is a one of a kind design configuration that promotes very high stresses due to the fact that it connects very large shells that have different thermal movement that connnot be accommodated by the short and stiff pipe. In addition the pipe is subject to thermal cycling. Both welds were repaired by a full structural weld overlay.

Conclusion

The BWR Reactor Water Cleanup System Program has been effective in managing RWCU System stress corrosion cracking.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the BWR Reactor Water Cleanup System Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.16 FIRE PROTECTION PROGRAM

Program Description

The Fire Protection Program is an existing program that provides guidance for performance of periodic visual inspections to manage aging of the various materials comprising rated fire barriers. These include (a) sealants in rated penetration seals (subject to shrinkage due to weathering); (b) concrete and steel in fire rated walls, ceilings, and floors (subject to loss of material due to flaking and abrasion; separation and concrete damage due to relative motion, vibration, and shrinkage); and (c) steel in rated fire doors (subject to loss of material due to corrosion and wear or mechanical damage). In addition the program requires testing of the diesel-driven fire pump to verify that it is performing its intended function. This activity manages aging of the diesel engine's fuel oil supply line and exhaust system, which may experience loss of material due to corrosion. Inspection and testing is performed in accordance with the guidance of applicable standards.

NUREG-1801 Consistency

The Fire Protection Program is an existing program that takes exception to certain elements of NUREG-1801, Section XI.M26 (Fire Protection) (Reference 2), but is consistent with the latest industry and regulatory License Renewal precedence.

Exceptions to NUREG-1801

NMP takes exception to the program described in NUREG-1801, Section M26, where it requires that hollow metal fire doors be inspected at least once bi-monthly, and that halon/carbon dioxide suppression system valve lineup inspections be performed on a monthly basis. Rather, NMP is consistent with ISG-04 on both issues.

Program Elements Affected

Parameters Monitored/Inspected:

- NMP will revise the current fire door inspection frequency to comply with a plant specific evaluation to be completed as an enhancement. While it is an exception to NUREG 1801, this is consistent with ISG-04 and the latest regulatory guidance.

Detection of Aging Effects:

- Valve lineups on the carbon dioxide/halon suppression systems are not credited for aging management in the Fire Protection Program at NMP. This is also consistent with ISG-04 and the latest regulatory guidance.

Enhancements

Enhancements to the Fire Protection Program encompass revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Scope, Parameters Monitored/Inspected, Detection of Aging Effects, Acceptance Criteria:

- Incorporate periodic visual inspections of piping and fittings in a non-water environment such as Halon and Carbon Dioxide fire suppression systems components, to detect evidence of corrosion and any system mechanical damage that could affect its intended function.

- Expand the scope of periodic functional tests of the diesel-driven fire pump to include inspection of engine exhaust system components to verify that loss of material is managed.

- Perform an engineering evaluation to determine the plant specific inspection periodicity of fire doors.

Enhancements will be completed prior to the period of extended operation.

Operating Experience

NMPNS has evaluated applicable industry operating experience. Applicable guidelines and requirements have been incorporated into Fire Protection Program implementing procedures. Minor degradation has been identified while performing Fire Protection Program activities (e.g., fire barrier penetration seals found damaged or cracked, fire dampers failed surveillance testing, and fire door inspections not satisfactory) and corrective actions taken. No significant age-related problems have been reported for NMPNS fire protection systems and components managed by the Fire Protection Program.

The Fire Protection Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Fire Protection Program has been effective in managing aging effects, including cracking, delamination, separation, and loss of materials used in fire barrier construction.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Fire Protection Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.17 FIRE WATER SYSTEM PROGRAM

Program Description

The Fire Water System Program is an existing program that manages aging of water-based fire protection systems due to loss of material and biofouling. Program activities include periodic maintenance, testing, and inspection of system piping and components containing water (e.g., sprinklers, nozzles, fittings, valves, hydrants, hose stations, standpipes). Inspection and testing is performed in accordance with the guidance of applicable National Fire Protection Association (NFPA) Codes and Standards and the Nuclear Electric Insurance Limited (NEIL) Members' Manual.

NUREG-1801 Consistency

The Fire Water System Program is an existing program that will be consistent with NUREG-1801, Section XI.M27 (Fire Water System) (Reference 2), and the latest industry and regulatory License Renewal precedence after enhancements are incorporated.

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the Fire Water System Program encompass revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Scope

Incorporate inspections to detect and manage loss of material due to corrosion into existing periodic test procedures.

Preventive Actions

Specify periodic component inspections to verify that loss of material is being managed.

Parameters Monitored/Inspected

Add procedural guidance for performing visual inspections to monitor internal corrosion and detect biofouling.

Detection of Aging Effects:

- Add requirements to periodically check the water-based fire protection systems for microbiological contamination.
- Measure fire protection system piping wall thickness using non-intrusive techniques (e.g., volumetric testing) to detect loss of material due to corrosion.

Monitoring and Trending - establish an appropriate means of recording, evaluating, reviewing, and trending the results of visual inspections and volumetric testing.

Acceptance Criteria - define acceptance criteria for visual inspections and volumetric testing.

Enhancements will be completed prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Fire Water System Program. A review of the corrective action program shows that individual components have experienced various types of non-conformances (e.g., pinhole leaks, pipe wall thinning). Evaluations have demonstrated that no loss of system function would occur.

DERs have been initiated to document conditions discovered while performing Fire Water System Program activities. Internal system leakage and failed surveillance tests were often traced to fouling of valve seating surfaces with sand or silt. Typical resolutions included adding sections of piping to specific flushing procedures or periodic disassembly and cleaning of components.

The Fire Water System Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Fire Water System Program has been effective in maintaining system availability.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Fire Water System Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.18 FUEL OIL CHEMISTRY PROGRAM

Program Description

The Fuel Oil Chemistry Program is an existing program that manages loss of material due to corrosion that may result from introduction of contaminants into the plant's fuel oil tanks. Program activities include (1) sampling and chemical analysis of the fuel oil inventory at the plant; (2) sampling, testing, and analysis of new fuel oil as it is unloaded at the plant; and (3) cleaning and inspection of fuel oil tanks. The Fuel Oil Chemistry Program is based on maintaining fuel oil quality in accordance with the guidelines of American Society for Testing Materials (ASTM) Standards D975, D1796, D2276, and D4057.

NUREG-1801 Consistency

The Fuel Oil Chemistry Program is an existing program that will be consistent with NUREG-1801, Section XI.M30 (Fuel Oil Chemistry) (Reference 2), after enhancements are incorporated.

Exceptions to NUREG-1801

Program Elements Affected

Parameters Monitored/Inspected, Acceptance Criteria:

- NMP 1 and NMP 2 take exception to using both ASTM D 1796 and ASTM D 2709 to determine the concentration of water and sediment in the diesel fuel oil tanks. NMP 1 and NMP 2 use only the guidance given in ASTM D 1796. These standards are applicable to fuel oils of different viscosities. ASTM D 1796 is the standard that applies to the diesel fuel used at NMP 1 and NMP 2.

- NMP 1 and NMP 2 take exception to using the *modified* ASTM D 2276, Method A which specifies a pore size of 3.0 µm. NMP 1 and NMP 2 use a filter with a pore size of 0.8 µm as specified in ASTM D 2276.

Detection of Aging Effects:

- NMP 1 and NMP 2 take exception to multilevel sampling in the diesel fuel oil tanks. The physical configuration of the fuel oil tanks does not allow a representative fuel oil sample to be taken at multiple levels.

Monitoring and Trending

- NMP 1 and NMP 2 take exception to periodically sampling the diesel fuel oil day tanks. These small tanks do not have a provision for sampling. Per Technical Specification Surveillance testing, the lower portion of the diesel fuel oil is drained quarterly in NMP 1, and monthly in NMP 2. This exception has been accepted in NUREG-1796, Dresden and Quad Cities Safety Evaluation Report.

Enhancements

Enhancements to the Fuel Oil Chemistry Program encompass revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Scope, Preventive Actions Parameters Monitored/Inspected, Detection of Aging Effects, Monitoring and Trending:

- Incorporate periodic tests for microbiological organisms at NMP 1.

- Provide guidelines for the appropriate use of biocides, corrosion inhibitors, and/or fuel stabilizers to maintain fuel oil quality.

- Add a requirement to sample the NMP 2 diesel fuel oil storage tanks for water and sediment at least quarterly per the ASTM standard.

Preventive Actions, Detection of Aging Effects:

- Add requirements to periodically inspect the interior surfaces of the NMP 1 emergency diesel fuel oil tanks and diesel fire pump fuel oil day tank, and the NMP 2 fuel oil tanks for evidence of significant degradation, including a specific requirement that the tank bottom thickness be determined.

Monitoring and Trending:

- Add a requirement for quarterly trending of particulate contamination analysis results.

Acceptance Criteria:

- Ensure acceptance criteria are specified in the implementing procedures for the applicable indications of potential degradation.

Enhancements will be completed prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Fuel Oil Chemistry Program. Review of plant-specific operating experience revealed several incidents where contaminants (e.g., water, particulate) were detected through Fuel Oil Chemistry Program examinations. Corrective actions included contamination removal and system/component cleaning. However, there have been no instances of fuel oil system component failures at NMPNS attributed to contamination.

The Fuel Oil Chemistry Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Fuel Oil Chemistry Program has been effective in managing aging effects, including general, pitting, and crevice corrosion.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Fuel Oil Chemistry Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.19 REACTOR VESSEL SURVEILLANCE PROGRAM

Program Description

The Reactor Vessel Surveillance Program is an existing program that manages loss of fracture toughness due to neutron irradiation embrittlement in the Reactor Pressure Vessel (RPV) beltline material. Program activities include (1) periodic withdrawal and testing of surveillance capsules from each RPV; (2) use of test results and allowable stress loadings for the ferritic RPV materials to determine operating limits; and (3) comparison with a large industry data set to confirm validity of test results. Analysis and testing are based on the requirements of 10 CFR 50, Appendix H, and ASTM Standard E-185 (Reference 7).

NUREG-1801 Consistency

The Reactor Vessel Surveillance Program is an existing program that will be consistent with NUREG 1801, Section XI.M31 (Reactor Vessel Surveillance) (Reference 2), after enhancements are incorporated.

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the Reactor Vessel Surveillance Program encompass revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

First paragraph of NUREG-1801 Program Description

Incorporate the requirements and elements of the ISP, as documented in BWRVIP-116 and approved by NRC, or an NRC approved plant-specific program, into the Reactor Vessel Surveillance Program, and include a requirement that if NMPNS surveillance capsules are tested, the tested specimens will be stored in lieu of optional disposal. When the NRC issues a final safety evaluation report (SER) for BWRVIP-116, NMPNS will address any open items and complete the SER Action Items. Should BWRVIP-116 not be approved by the NRC, a plant specific reactor vessel surveillance program will be submitted to the NRC two years prior to commencement of the period of extended operation.

Items 1 and 3 of NUREG-1801 Program Description

Project analyses of upper shelf energy and pressure-temperature limits to 60 years using methods prescribed by Regulatory Guide 1.99, Revision 2, and include the applicable bounds of the data, such as operating temperature and neutron fluence.

Enhancements will be completed prior to the period of extended operation.

Operating Experience

NMPNS has successfully implemented a plant-specific Reactor Vessel Surveillance Program that is consistent with Regulatory Guide 1.99, Revision 2, 10 CFR 50, Appendix H, and ASTM Standard E-185. Three surveillance capsules that were originally installed in the NMP1 RPV have been removed and tested with satisfactory results. One of the three surveillance capsules that were originally installed in the NMP2 RPV has been removed and tested. Data from LaSalle Unit 1, LaSalle Unit 2, and Columbia Generating Station have been used to supplement the NMP2 surveillance data.

Under the ISP, neither NMP1 nor NMP2 is identified as a host plant; the representative materials for the limiting RPV plate and weld materials, and their associated withdrawal schedules, are identified in BWRVIP-116. Thus, future withdrawal and testing of the NMP1 and NMP2 surveillance capsules will be permanently deferred.

Through participation in the BWRVIP ISP, the NMPNS Reactor Vessel Surveillance Program will be adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Reactor Vessel Surveillance Program has been effective in managing loss of fracture toughness in RPV beltline materials.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Reactor Vessel Surveillance Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.20 ONE-TIME INSPECTION PROGRAM

Program Description

The One-Time Inspection Program is a new program that manages aging effects with potentially long incubation periods for susceptible components WSLR. Program activities include visual, volumetric, and other established inspection techniques consistent with industry practice to provide a means of verifying that an aging effect is either (1) not occurring, or (2) progressing so slowly that it has a negligible effect on the intended function of the structure or component. The program also provides measures for verifying the effectiveness of existing AMPs. If a one-time inspection reveals an aging effect requiring management, an evaluation is required to determine the ability of the affected component to perform its intended function(s) during the period of extended operation and any appropriate corrective action.

For stagnant or low flow areas in treated-water systems, the One-Time Inspection Program will determine the effectiveness of the Water Chemistry Control Program (Section B2.1.2) in managing the effects of aging. A representative sample will be selected from structures and components grouped on the basis of common characteristics such as materials of construction, fabrication process, operating environment, or aging effects. The sample size will be selected such that it encompasses the most susceptible components. Similar considerations will be used to select inspection samples; (1) for components that have an aging effect requiring management that is not expected to occur; or (2) for components where the aging effect is occurring very slowly.

For Class 1 piping less than four inches in diameter (nominal pipe size) that is directly connected to the reactor coolant pressure boundary, the One-Time Inspection Program will determine if cracking is occurring. Selection of components for inspection will be based on factors such as piping geometry, piping size, and flow conditions. Inspections will use existing non-destructive evaluation practices. If a flaw is detected, appropriate additional examinations will be performed using methods currently employed for similar components within the scope of the ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program (Section B2.1.1).

Selective leaching is also part of the One-Time Inspection Program. It is an aging effect that occurs very slowly, and NMPNS has identified potentially susceptible components in various systems. The process for identifying the population of potentially affected components will be based upon common characteristics of the components, such as material of construction, fabrication process, operating environment, and aging effects. From the selected population, a sample size will be determined to provide a 90 percent confidence that 90 percent of the population does not have the degradation mechanism present. This terminology and methodology are consistent with EPRI TR-107514, 'Age-Related Degradation Inspection Method and Determination'. Inspection techniques may include a one-time visual inspection and hardness measurement.

NUREG-1801 Consistency

The One-Time Inspection Program is a new program that will be implemented prior to the period of extended operation in a manner consistent with NUREG-1801, Section XI.M32 (One-Time Inspection) (Reference 2).

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The One-Time Inspection Program is a new program at NMPNS; therefore, no programmatic operating experience is available. As operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

There is reasonable assurance that aging effects will be managed by the implementation of the One-Time Inspection Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.21 SELECTIVE LEACHING OF MATERIALS PROGRAM

Program Description

The Selective Leaching of Materials Program is a new program that manages aging of components susceptible to selective leaching. The potentially susceptible components include valve bodies, valve bonnets, pump casings, and heat exchanger components in various systems.

Implementation of the Selective Leaching of Materials Program is discussed in the program description for the One-Time Inspection Program (Section B2.1.20).

NUREG-1801 Consistency

The Selective Leaching of Materials Program, as implemented by the program listed above, will be consistent with NUREG-1801, Section XI.M33 (Selective Leaching of Materials) (Reference 2).

B2.1.22 BURIED PIPING AND TANKS INSPECTION PROGRAM

Program Description

The Buried Piping and Tanks Inspection Program is a new program that will manage the aging effects on the external surfaces of carbon steel, low-alloy steel, and cast iron components (e.g. tanks, piping) that are buried in soil. Program activities will include visual inspections of external coatings and wrappings to detect damage and degradation. Periodicity of inspections will be based on plant operating experience and opportunities for inspection due to maintenance. If an opportunistic inspection does not occur within the first ten years of extended operation, NMPNS will excavate a representative sample for the purpose of inspection.

NUREG-1801 Consistency

The Buried Piping and Tanks Inspection Program is a new program that will be implemented prior to the period of extended operation in a manner consistent with NUREG-1801, Section XI.M34 (Buried Piping and Tanks Inspection) (Reference 2).

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Buried Piping and Tanks Inspection Program is a new program at NMPNS; therefore, no programmatic operating experience is available. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

There is reasonable assurance that aging effects will be managed by the implementation of the Buried Piping and Tanks Inspection Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.23 ASME SECTION XI INSERVICE INSPECTION (SUBSECTION IWE) PROGRAM

Program Description

The ASME Section XI Inservice Inspection (Subsection IWE) Program (referred to herein as the IWE ISI Program) is an existing program that manages aging effects due to (1) corrosion of carbon steel components comprising the NMP1 and NMP2 containment pressure boundaries; and (2) degradation of NMP1 and NMP2 containment pressure-retaining polymers. Program activities include visual examination, with limited surface or volumetric examinations when augmented examination is required. The IWE ISI Program is based on the 1998 edition of the ASME Boiler and Pressure Vessel Code, Section XI (Subsection IWE) for containment inservice inspection with plant-specific exceptions approved by the NRC.

NUREG-1801 Consistency

The IWE ISI Program is an existing program that takes exception to certain NUREG-1801, Section XI.S1 (ASME Section XI, Subsection IWE) evaluation elements and requires enhancements to be consistent with others. (Reference 2)

Exceptions to NUREG-1801

The evaluation in NUREG-1801, Section XI.S1, covers ASME Section XI requirements from both the 1992 edition with the 1992 addenda and the 1995 edition with the 1996 addenda. The IWE ISI programs for NMP1 and NMP2 are based on the 1998 edition. This was found acceptable by the NRC in an SER dated August 17, 2000 (Reference 29).

Program Elements Affected

- Parameters Monitored or Inspected, Detection of Aging Effects, Monitoring and Trending, Acceptance Criteria

Program activities are implemented through the IWE ISI Program submitted to the NRC as identified in the SER listed above.

Enhancements

An augmented VT-1 visual examination of the NMP1 and NMP2 containment penetration bellows will be performed using enhanced techniques qualified for detecting SCC, per NUREG-1611, Table 2, Item 12.Enhancements will be completed prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the IWE ISI Program. Review of plant-specific operating experience revealed few noteworthy discrepancies and no age-related equipment failures. Deficiencies discovered by recent IWE ISI Program examinations included damage to the NMP1 torus equipment hatch, damage to the NMP1 drywell dome manway hatch sealing surface, minor corrosion on the NMP1 drywell dome sealing surface, and minor corrosion on the NMP2 drywell liner. These indications were investigated and corrected as reported in Reference 34 (for NMP1) and Reference 35 (for NMP2).

The plant continuously reviews industry operating experience to determine its applicability to NMPNS and adjusts inspection plans accordingly. Plant-specific operating experience is reviewed and trended; findings are documented, reviewed, and resolved; corrective actions are taken; and mitigative actions to limit aging initiated.

Conclusion

The IWE ISI Program has been effective in managing loss of material and changes in material properties for the NMPNS containment structures.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the IWE ISI Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.24 ASME SECTION XI INSERVICE INSPECTION (SUBSECTION IWL) PROGRAM [UNIT 2 ONLY]

Program Description

The ASME Section XI Inservice Inspection (Subsection IWL) Program (referred to herein as the IWL ISI Program) is an existing program that manages aging of concrete in the NMP2 containment wall, base mat, and drywell floor. Program activities include general visual examination of all accessible concrete surface areas, with provisions for detailed visual examination when deterioration and distress of suspect areas is detected. The IWL ISI Program is based on the 1998 edition of the ASME Boiler and Pressure Vessel Code, Section XI (Subsection IWL) for containment inservice inspection with plant-specific exceptions approved by the NRC. (Note: this program applies to concrete elements of BWR Mark II and III Containment structures. NMP1 is BWR Mark I Containment. Therefore, this program does not apply to NMP1).

NUREG-1801 Consistency

The IWE ISI Program is an existing program that takes exception to certain NUREG-1801, Section XI.S2 (ASME Section XI, Subsection IWL) evaluation elements (Reference 2).

Exceptions to NUREG-1801

The evaluation in NUREG-1801, Section XI.S2, covers ASME Section XI requirements from both the 1992 edition with the 1992 addenda and the 1995 edition with the 1996 addenda. The IWL ISI Program for NMP2 is based on the 1998 edition. This was found acceptable by the NRC in an SER dated August 17, 2000 (Reference 29).

Program Elements Affected

- Parameters Monitored or Inspected, Detection of Aging Effects, Monitoring and Trending, Acceptance Criteria

Program activities are implemented through the IWL ISI Program submitted to the NRC as identified in the SER listed above.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the IWL ISI Program. Review of plant-specific operating experience revealed no DERs written as a result of IWL ISI Program inspections since program inception.

The plant continuously reviews industry operating experience to determine its applicability to NMPNS and adjusts inspection plans accordingly. Plant-specific operating experience is reviewed and trended; findings are documented, reviewed, and resolved; corrective actions are taken; and mitigative actions to limit aging initiated.

Conclusion

The IWL ISI Program has been effective in managing loss of material and changes in material properties for the NMP2 containment structure.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the IWL ISI Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.25 ASME SECTION XI INSERVICE INSPECTION (SUBSECTION IWF) PROGRAM

Program Description

The ASME Section XI Inservice Inspection (Subsection IWF) Program (referred to herein as the IWF ISI Program) is an existing program that manages aging of carbon steel component and piping supports, including ASME Class MC supports, due to general corrosion and wear. Program activities include visual examination to determine the general mechanical and structural condition of components and their supports. The IWF ISI Program is based on the 1989 edition of the ASME Boiler and Pressure Vessel Code, Section XI (Subsection IWF) for inservice inspection of supports and implements the alternate examination requirements of ASME Code Case N-491-1.

NUREG-1801 Consistency

The IWF ISI Program is an existing program that takes exception to certain NUREG-1801, Section XI.S3 (ASME Section XI, Subsection IWF) evaluation elements (Reference 2).

Exceptions to NUREG-1801

The evaluation in NUREG-1801, Section XI.S3, covers ASME Section XI requirements from the 1989 edition through the 1995 edition and addenda through the 1996 addenda. The IWF ISI programs for NMP1 and NMP2 are based on the 1989 edition with no addenda. This was found acceptable by the NRC in SERs dated October 5, 2000 (Enclosure to Reference 24) and March 3, 2000 (Enclosure to Reference 25), respectively. Additionally, the IWF ISI programs implement the alternate examination requirements of

ASME Code Case N-491-1 as approved for use in Regulatory Guide 1.147 (Reference 40).

Program Elements Affected

Scope, Parameters Monitored/Inspected, Acceptance Criteria

Program activities are implemented through the IWF ISI program plans submitted to the NRC as identified in the SERs listed above.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the IWF ISI Program. Review of plant-specific operating experience revealed no age-related failures of any supports within the scope of the IWF ISI Program.

The plant continuously reviews industry operating experience to determine its applicability to NMPNS and adjusts inspection plans accordingly. Plant-specific operating experience is reviewed and trended; findings are documented, reviewed, and resolved; corrective actions are taken; and mitigative actions to limit aging initiated.

Conclusion

The IWF ISI Program has been effective in managing aging of Class 1, 2, and 3 component supports (including piping supports and ASME Class MC supports) at NMPNS.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the IWF ISI Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.26 10 CFR 50 APPENDIX J PROGRAM

Program Description

The 10 CFR 50 Appendix J Program [referred to herein as the Containment Leak Rate Test (LRT) Program] is an existing program that detects degradation of the containment structure and components that comprise the containment pressure boundary, including seals and gaskets. The Program is not relied on to detect the onset or progression of degradation prior to it resulting in leakage. Containment leak rate tests are performed to assure that leakage through the primary containment and systems and components penetrating primary containment does not exceed allowable leakage limits specified in the Technical Specifications. Type A tests measure the primary reactor containment overall integrated leakage rate, and include visual examination of the interior and exterior surfaces of the containment for evidence of structural deterioration. Type B tests measure leakage across each pressure-containing or leakage-limiting boundary, including (1) containment penetrations whose design incorporates resilient seals, gaskets, or sealant compounds; (2) piping penetrations fitted with expansion bellows; (3) electrical penetrations fitted with flexible metal seal assemblies; (4) air lock door seals; and (5) doors with resilient seals or gaskets. Type C tests measure the leakage rates for containment isolation valves. The Containment LRT Program complies with Option B requirements of 10 CFR 50 Appendix J for primary containment testing with plant-specific exceptions approved by the NRC as part of license amendments, and implements the guidelines provided in NRC Regulatory Guide 1.163 (Reference 16) and NEI 94-01 (Reference 8).

NUREG-1801 Consistency

The Containment LRT Program is an existing program that is consistent with NUREG-1801, Section XI.S4 (10 CFR Part 50, Appendix J) (Reference 2).

Exceptions to NUREG-1801

None. Implementation of Option B requirements for NMP2 required exemptions from certain requirements of 10 CFR 50 Appendix J and exceptions from certain requirements of NRC Regulatory Guide 1.163. These plant-specific alternatives were approved by the NRC prior to implementation (Reference 36) and are not considered to be exceptions to the NUREG-1801 program elements.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Containment LRT Program. Neither NMP1 nor NMP2 has experienced a total leakage rate in the past two refueling outages that was above Containment LRT Program acceptance criteria.

The Containment LRT Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Containment LRT Program has been effective in managing loss of leak-tightness and changes in material properties for components forming the primary containment pressure boundary.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Containment LRT Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.27 MASONRY WALL PROGRAM

Program Description

The Masonry Wall Program is an existing program that manages aging effects so that the evaluation basis established for each masonry wall WSLR remains valid through the period of extended operation. The Masonry Wall Program is based on the structures monitoring requirements of 10 CFR 50.65.

Implementation of the Masonry Wall Program is discussed in the program description for the Structures Monitoring Program (Section B2.1.28).

NUREG-1801 Consistency

The Masonry Wall Program, as implemented by the program listed above, will be consistent with NUREG-1801, Section XI.S5 (Masonry Wall Program) (Reference 2), after enhancements to the Structures Monitoring Program are incorporated.

B2.1.28 STRUCTURES MONITORING PROGRAM

Program Description

The Structures Monitoring Program is an existing program that manages aging of structures, structural components, and structural supports WSLR at NMPNS. The program provides for periodic visual inspections, surveys, and examination of all safety related buildings (including the primary containment and substructures within the primary containment) and various other buildings WSLR. Program activities identify degradation of materials of construction, which include structural steel, concrete, masonry block, sealing materials. While not credited for mitigation of aging, protective coatings are also inspected under this program. The Structures Monitoring Program, which was initially developed to meet the regulatory requirements of 10 CFR 50.65, implements guidance provided in Regulatory Guide 1.160 (Reference 17), NUMARC 93-01 (Reference 9), and NEI 96-03 (Reference 10).

NUREG-1801 Consistency

The Structures Monitoring Program is an existing program that will be consistent with NUREG-1801, Section XI.S6 (Structures Monitoring Program) (Reference 2), after enhancements are incorporated.

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the Structures Monitoring Program include expansion of scope and revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Scope

Expand the program to include the following activities or components in the scope of License Renewal but not within the current scope of 10 CFR 50.65: (a) NMP2 Fire Rated Assemblies & Watertight Penetration Visual Inspections, (b) NMP2 masonry walls in the Turbine Building and Service Water Tunnel serving a fire barrier function, and (c) the steel electrical transmission towers required for the SBO and recovery paths for NMP1 and NMP2.

Parameters Monitored/Inspected, Detection of Aging Effects, Acceptance Criteria

Expand the parameters monitored during structural inspections to include those relevant to aging effects identified for structural bolting.

Parameters Monitored/Inspected, Detection of Aging Effects

Implement regularly scheduled ground water monitoring to ensure that a benign environment is maintained.

Enhancements will be completed prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Structures Monitoring Program. Since implementation of inspections under the Structures Monitoring Program, minor cracking has been identified in various concrete structures and slight (but stable) ground water leaks have occurred in some tunnels. However, a review of plant-specific operating experience revealed no cases of structural failure caused by unidentified degradation. Similarly, no structural deficiencies have been identified in flood control structures.

The Structures Monitoring Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Structures Monitoring Program has been effective in managing aging effects to which structural materials are susceptible.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Structures Monitoring Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.29 NON-EQ ELECTRICAL CABLES AND CONNECTIONS PROGRAM

Program Description

The Non-EQ Electrical Cables and Connections Program is a new program that manages aging of cables and connectors WSLR exposed to adverse localized temperature, moisture, or radiation environments. Program activities include visual inspection of susceptible cables for evidence of cable and connection jacket surface anomalies. Inspections are conducted at least once every ten years, with the first representative sample of susceptible cables inspected prior to expiration of the current NMPNS licenses.

NUREG-1801 Consistency

The Non-EQ Electrical Cables and Connections Program is a new program that will be implemented prior to the period of extended operation in a manner consistent with NUREG-1801, Section XI.E1 (Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements) (Reference 2).

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Non-EQ Electrical Cables and Connections Program is a new program at NMPNS; therefore, no programmatic operating experience is available. As operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

There is reasonable assurance that aging effects will be managed by the implementation of the Non-EQ Electrical Cables and Connections Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.30 NON-EQ ELECTRICAL CABLES AND CONNECTIONS USED IN INSTRUMENTATION CIRCUITS PROGRAM

Program Description

The Non-EQ Electrical Cables Used in Instrumentation Circuits Program is an existing program that manages aging of cables and connections exposed to adverse localized temperature and radiation environments that could result in loss of insulation resistance. It applies to accessible and inaccessible electrical cables that are not in the EQ Program and are used in circuits with sensitive, high-voltage, low-level signals such as radiation monitoring, nuclear instrumentation, and other such cables subject to aging management review that are sensitive to a reduction in insulation resistance. Activities include routine calibration tests of instrumentation loops or direct testing of the cable system in those cases where cable testing is conducted as an alternate to surveillance testing, and in either case are implemented through the Surveillance Testing and Preventive Maintenance Programs. Testing is based on requirements of the particular calibrations, surveillances or testing performed on the specific instrumentation circuit or cable and is implemented through the NMPNS work control system. Where cable testing is conducted as an alternate to surveillance testing the acceptance criteria for each test will be defined by the specific type of test performed and the specific cable tested.

NUREG-1801 Consistency

The Non-EQ Electrical Cables Used in Instrumentation Circuits Program is an existing program that will be consistent with NUREG-1801, Section XI.E2 (Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits) (Reference 2) and the latest industry and regulatory License Renewal precedence after enhancements are incorporated.

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the Non-EQ Electrical Cables Used in Instrumentation Circuits Program encompass revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following element:

Detection of Aging Effects:

- Implement reviews of calibration or surveillance data for indications of aging degradation affecting instrument circuit performance. The first reviews will be completed prior to the period of extended operation and every ten years thereafter. A review of the calibration and surveillance results can provide indications of aging effects by monitoring key parameters and providing data based upon acceptance criteria related to instrumentation circuit performance. Review of the data occurs at the time that the calibrations and surveillances are performed, thereby providing reasonable assurance that severe aging degradation will be detected prior to loss of the cables' intended function.

- In cases where a calibration or surveillance program does not include the cabling system in the testing circuit, or as an alternative to the review of calibration results described above, provide requirements and procedures to perform cable testing to detect deterioration of the insulation system, such as insulation resistance tests or other testing judged to be effective in determining cable insulation condition. The first test will be completed prior to the period of extended operation. The test frequency of these cables shall be determined based on engineering evaluation not to exceed every 10 years.

Enhancements will be completed to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Non-EQ Electrical Cables Used in Instrumentation Circuits Program. Review of plant-specific operating experience revealed documentation of cable degradation identified through routine calibration testing that is similar to the industry operating experience (e.g., degraded cables for temperature instruments, degraded shielding for drywell instrument cables).

The Non-EQ Electrical Cables Used in Instrumentation Circuits Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Non-EQ Electrical Cables Used in Instrumentation Circuits Program has been effective in managing aging effects, including loss of insulation resistance in instrumentation cables and connections.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Non-EQ Electrical Cables Used in Instrumentation Circuits Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.31 DELETED

B2.1.32 PREVENTIVE MAINTENANCE PROGRAM

Program Description

The Preventive Maintenance (PM) Program is an existing plant-specific program that consists of the appropriate ten elements described in Appendix A of NUREG-1800 (Reference 1). The PM Program manages aging effects for SSCs WSLR. The program provides for performance of various maintenance activities on a specified frequency based on vendor recommendations and operating experience.

Aging Management Program Elements

The key elements of aging management activities, which are used in the PM Program, are described below. The results of an evaluation of each key element against the appropriate ten elements described in Appendix A of NUREG-1800 are provided below.

Scope of Program

The PM Program manages aging effects for many SSCs WSLR whose aging is not managed by other AMPs. The scope of the program includes, but is not limited to, valve bodies, heat exchangers, expansion joints, tanks, ductwork, fan/blower housings, dampers, and pump casings.

Preventive Actions

Although routine maintenance is largely preventive in nature, only the condition monitoring aspects of PM Program activities are credited for license renewal. For example, when a piping system is opened to conduct preventive maintenance on a valve, a visual inspection of the valve body and/or piping may be specified. Such activities do not prevent aging effects from occurring, but will identify degraded conditions that would affect the ability of the component to perform its intended function. Consequently, there are no specific preventive actions associated with this program.

Parameters Monitored/Inspected

Inspection and testing activities monitor various parameters, including surface condition, for evidence of defects and age-related degradation.

Detection of Aging Effects

The aging effects of concern will be detected by visual inspection and examination of component surfaces for evidence of defects and age-related degradation.

Monitoring and Trending

The PM Program is a condition-monitoring program performed on a specified schedule. After the inspection results are documented, they are reviewed and evaluated.

Acceptance Criteria

The PM Program establishes specific acceptance criteria for each component inspected. The acceptance criteria are related to the aging effects requiring management and are dependent on each individual inspection and examination considering the aging effect being managed.

Corrective Actions

The program documentation has specific requirements to initiate a DER in accordance with the NMPNS Corrective Action Program. The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the NMPNS commitment to the corrective action criteria of 10 CFR 50, Appendix B (Reference 3). The NMPNS Corrective Action Program includes the identification and correction of conditions adverse to quality and the identification, cause determination, correction, and actions to minimize recurrence, for significant conditions adverse to quality.

Confirmation Process

The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the confirmation process for NMPNS under the corrective action criterion. At NMPNS, the confirmation process is implemented through Corrective Action Effectiveness Reviews and is performed for significant conditions adverse to quality and selected hardware related conditions adverse to quality. The Corrective Action Program includes, but is not limited to, safety-related, non-safety related and fire protection SSCs. Therefore, those SSCs required to be in-scope for License Renewal are addressed as part of the current Corrective Action Program.

Administrative Controls

The administrative controls for NMPNS are discussed in the plant's Conduct of Operations description (Section XIII in Reference 12 and Chapter 13 in Reference 13) and the Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13). Site procedures provide guidance on procedures and other forms of administrative control documents.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the PM Program as part of a process to optimize maintenance practices. Review of plant-specific operating experience revealed DERs initiated as a result of PM Program examinations. In cases where age-related degradation was identified, the reported conditions (e.g., corrosion of motor-operated valves, piping, heat exchanger internals) were resolved through implementation of the work order process prior to loss of an intended function.

The PM Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Exceptions to NUREG-1800

None

Enhancements

Enhancements to the PM Program encompass revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Scope

Expand the PM Program to encompass activities for certain additional components, identified as requiring aging management. Explicitly define the aging management attributes, including the systems and the component types/commodities included in the program.

Preventive Actions

Specifically list those activities credited for aging management.

Parameters Monitored/Inspected

Specifically list parameters monitored.

Detection of Aging Effects

Specifically list the aging effects detected.

Monitoring and Trending

Establish a requirement that inspection data be monitored and trended.

Acceptance Criteria

Establish detailed parameter-specific acceptance criteria.

Enhancements will be completed prior to the period of extended operation.

Conclusion

The PM Program has been effective in maintaining the intended functions of long-lived passive SSCs. The effectiveness of the PM Program is also reflected in the level of system/equipment availability documented by Maintenance Rule Periodic Assessments.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the PM Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.33 SYSTEMS WALKDOWN PROGRAM

Program Description

The Systems Walkdown Program is an existing plant-specific program that consists of the appropriate ten elements described in Appendix A of NUREG-1800 (Reference 1). The Systems Walkdown Program manages aging effects for accessible external surfaces of systems and components WSLR at NMPNS. The aging effects of concern are material degradation and loss of material from external surfaces of pumps, valves, piping, bolts, heat exchangers, tanks, HVAC components, and other components. The program also identifies adverse conditions that can lead to aggressive environments for systems or components within the scope of LR. Program activities include system engineer walkdowns (i.e., field evaluations of system components to assess material condition), documentation and evaluation of inspection results, and appropriate corrective actions.

Aging Management Program Elements

The key elements of aging management activities, which are used in the Systems Walkdown Program, are described below. The results of an evaluation of each key element against the appropriate ten elements described in Appendix A of NUREG-1800 are provided below.

Scope of Program

The scope of the Systems Walkdown Program will be accessible external surfaces of systems and components WSLR and subject to AMR. The inspections will look for loss of material, material degradation, and leakage. The scope includes portions of systems and components within the scope of LR such as pumps, valves, piping, bolting, heat exchangers, tanks, HVAC components, and other components.

Preventive Actions

The Systems Walkdown Program is a condition monitoring program, which identifies material degradation through regular inspection of in-scope components and identifies degraded conditions that could affect the ability of the component to perform its intended function. Consequently, there are no specific preventive actions associated with this program other than the identification of adverse environments and the aging effects of concern before functional failure to the component or the pressure boundary occurs.

Parameters Monitored/Inspected

System engineers conduct visual inspections of accessible portions of credited systems and components WSLR. . Visible degradation, anomalous indications, or adverse conditions are documented and evaluated. Adverse conditions that can lead to aggressive environments for inscope components, such as evidence of leakage, wetted insulation, or degraded non-safety related or out of scope piping or anchor points attached to in-scope portions, are also monitored.

Detection of Aging Effects

The aging effects of concern will be detected and documented through visual inspections performed during system walkdowns. The frequency of inspections is such that the inscope portions of systems are walked down at least once per refueling cycle. The periodicity is evaluated to ensure intended functions are preserved between cycles.

Monitoring and Trending

Inspection results are documented in Walkdown Reports, which are maintained in applicable system files. These reports, as well as other site and industry operating experience, are reviewed prior to each walkdown to provide areas of focus and a checklist validation of inspected items. Additionally, any adverse indication left uncorrected will be trended to ensure corrective actions are taken prior to a loss of intended function.

Acceptance Criteria

The program will be enhanced to specify acceptance criteria for visual inspections to ensure aging related degradation is properly identified.

Corrective Actions

The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the NMPNS commitment to the corrective action criteria of 10 CFR 50, Appendix B (Reference 3). The System Walkdown Program directs use of the site corrective action program when conditions adverse to quality are identified. The NMPNS Corrective Action Program includes the identification and correction of conditions adverse to quality and the identification, cause determination, correction, and actions to minimize recurrence for significant conditions adverse to quality. Program corrective actions also address the impact of the adverse condition on inaccessible areas.

Confirmation Process

The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the confirmation process for NMPNS under the corrective action criterion. At NMPNS, the confirmation process is implemented through Corrective Action Effectiveness Reviews and is performed for significant conditions adverse to quality and selected hardware related conditions adverse to quality. The Corrective Action Program includes, but is not limited to, safety-related, non-safety related and fire protection SSCs. Therefore, those SSCs required to be in-scope for

License Renewal are addressed as part of the current Corrective Action Program.

Administrative Controls

The Systems Walkdown Program is currently implemented through department administrative procedures which are subject to the 10 CFR 50 Appendix B administrative controls program.

The administrative controls for NMPNS are discussed in the plant's Conduct of Operations description (Section XIII in Reference 12 and Chapter 13 in Reference 13) and the Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13).

Operating Experience

The Systems Walkdown Program has relied upon system health reports to document the overall material condition of various plant systems. As such, operating experience has been incorporated into the system health reports and not directly into the Systems Walkdown Program. Enhancements will be made to this program to include previous operating experience and to ensure future operating experience is properly incorporated.

A review of the corrective action history related to material condition demonstrates the past usefulness of walkdowns in identifying visually detectable age-related degradation (e.g., general corrosion of bolting, supports, and component surfaces). As additional operating experience is obtained, lessons learned will be used to adjust the System Walkdown Program as needed.

Exceptions to NUREG-1800

None

Enhancements

Enhancements to the Systems Walkdown Program encompass revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Detection of Aging Effects

Train all personnel performing inspections in the Systems Walkdown Program to ensure that age related degradation is properly identified and incorporate this training into the site training program.

Acceptance Criteria

Specify acceptance criteria for visual inspections to ensure aging related degradation is properly identified and corrected.

Enhancements will be completed prior to the period of extended operation.

Conclusion

Recording and reporting visually detectable degradation has been part of good engineering practice at NMPNS for many years, and this practice will continue under the Systems Walkdown Program.

There is reasonable assurance that aging effects will be managed by the continued implementation of the Systems Walkdown Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.34 NON-SEGREGATED BUS INSPECTION PROGRAM

Program Description

The Non-Segregated Bus Inspection Program is an existing plant-specific program that consists of the appropriate ten elements described in Appendix A of NUREG-1800 (Reference 1), with exceptions. The Program is consistent with the industry and regulatory license renewal precedence. This program inspects components and materials internal to the non-segregated bus ducts that connect the reserve auxiliary transformers to the 4160V buses required for the recovery of offsite power to both units following a Station Blackout (SBO) event. Based upon the most recent industry and regulatory license renewal precedence, this program also includes bus ducts associated with power boards feeding components WSLR. They are normally energized, and therefore, the bus duct insulation material will experience temperature rise due to energization, which may cause age-related degradation during the extended period of operation. This inspection program considers the technical information and guidance provided in References 20, 21, 22, 23, and the latest industry and regulatory information on bus duct aging management.

Aging Management Program Elements

The key elements of aging management activities, which are used in the Non-Segregated Bus Inspection Program, are described below. The results of an evaluation of each key element against the appropriate ten elements described in Appendix A of NUREG-1800 and the latest industry and regulatory license renewal precedence are provided below.

Scope of Program

This program applies to the bus ducts within the scope of license renewal; i.e., those non-segregated bus ducts that connect the reserve auxiliary transformers to the 4160V buses required for the recovery of offsite power to both units following an SBO event, as well those associated with power boards feeding components WSLR.

Preventive Actions

This is an inspection program and no actions are taken as part of this program to prevent or mitigate aging degradation.

Parameters Monitored/Inspected

A sample of accessible bolted connections (bus joints and ending devices) will be checked for proper torque, or the resistance of bolted joints will be checked using a micro-ohm meter of sufficient current capacity that is suitable for checking bus bar connections. This program also inspects the internal portions of accessible bus ducts for cracks, corrosion, foreign debris, dust buildup, and water intrusion. The bus insulation system is inspected for signs of embrittlement, cracking, melting, swelling, or discoloration, which may indicate overheating or age-related degradation. The internal bus supports (insulators) will be inspected for structural integrity and cracking.

Detection of Aging Effects

Visual inspection of internal portions of bus ducts detects cracks, corrosion, debris, dust, and evidence of water intrusion. Visual inspection of the bus insulating system detects embrittlement, cracking, melting, swelling, and discoloration. Visual inspection of bus supports (insulators) detects cracking and lack of structural integrity. Internal portions of bus ducts, the bus insulation system, and the bus supports (insulators) are visually inspected approximately every 6 years.

A resistance test of the bus ducts or a torque test of a sample of accessible bolted connections will be performed approximately every 6 years. An initial inspection will be completed before the end of the initial 40-year license term. This is an adequate period to identify failures of the bus ducts since experience has shown that aging degradation is a slow process. A 6-year inspection frequency will provide up to three data points during a 20-year period, which can be used to characterize the degradation rate.

If unacceptable degradation is found, as indicated by either increased resistance or visual anomalies, the inspections will be expanded to determine the extent of the condition.

Monitoring and Trending

Monitoring and trending are not used for this program. See "Exceptions to NUREG-1800," below.

Acceptance Criteria

Bolted connections must meet the manufacturer's minimum torque specifications, or the low resistance value of the buss ducts must be appropriate for the application. Bus ducts are to be free from unacceptable visual indications of surface anomalies that suggest that conductor insulation degradation exits. Additional acceptance criteria include no indication of unacceptable corrosion, cracking, foreign debris, excessive dust buildup, or moisture intrusion. Any condition or situation that, if not corrected, could lead to a loss of intended function is considered unacceptable.

Corrective Actions

Corrective actions are documented using the DER process. The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the NMPNS commitment to the corrective action criteria of 10 CFR 50, Appendix B (Reference 3). The NMPNS Corrective Action Program includes the identification and correction of conditions adverse to quality and the identification, cause determination, correction, and actions to minimize recurrence for significant conditions adverse to quality.

Confirmation Process

The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the confirmation process for NMPNS under the corrective action criterion. At NMPNS, the confirmation process is implemented through Corrective Action Effectiveness Reviews and is performed for significant conditions adverse to quality and selected hardware related conditions adverse to quality. The Corrective Action

Program includes, but is not limited to, safety-related, non-safety related and fire protection SSCs. Therefore, those SSCs required to be in-scope for License Renewal are addressed as part of the current Corrective Action Program.

Administrative Controls

The Non-Segregated Bus Inspection Program will be implemented through documents that are subject to administrative controls. The administrative controls for NMPNS are discussed in the plant's Conduct of Operations description (Section XIII in Reference 12 and Chapter 13 in Reference 13) and the Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13).

Operating Experience

Inspections of the bus ducts WSLR at NMPNS have not revealed any age related degradation that could result in a loss of intended function.

Exceptions to NUREG-1800

Program Elements Affected

Monitoring and Trending:

Trending is not included as part of this program because the ability to trend inspection results is limited by available data; however, inspection results will be used to characterize degradation rates. This exception is consistent with latest industry and regulatory License Renewal precedence.

Enhancements

Existing inspection procedures will be enhanced to expand visual inspections of the bus ducts, their supports and insulation systems. Also, new provisions will be made to perform either periodic low range resistance checks of the bus ducts or torque checks of a statistical sample of accessible bolted connections.

Enhancements will be completed prior to the period of extended operation.

Conclusion

There is reasonable assurance that aging effects will be managed by the implementation of the Non-Segregated Bus Inspection Program such that

SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.35 FUSE HOLDER INSPECTION PROGRAM

Program Description

The Fuse Holder Inspection Program is a new plant-specific program that will consist of the appropriate ten elements described in Appendix A of NUREG-1800 (Reference 1) as well as the most recent industry and regulatory License Renewal precedence.

Fuse holders/blocks are classified as a specialized type of terminal block because of the similarity in design and construction. The fuse holders are typically constructed of blocks of rigid insulating material, such as phenolic resins. Metallic clamps are attached to the blocks to hold each end of the fuse. The clamps can be spring-loaded clips that allow the fuse ferrules or blades to slip in, or they can be bolt lugs, to which the fuse ends are bolted. The clamps are typically made of copper. The aging of the fuse holder insulation material will be managed under the program for Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements (Section B2.1.29) The Fuse Holder Inspection Program includes the following aging stressors: moisture, fatigue, ohmic heating, mechanical stress, vibration, thermal cycling, electrical transients, chemical contamination, oxidation, and corrosion.

In-scope fuse holders are tested to provide a direct indication of the condition of the metallic clamps. Fuses may be tested using either thermography or contact resistance.

Aging Management Program Elements

The key elements of aging management activities, which are used in the Fuse Holder Inspection Program, are described below. The results of an evaluation of each key element against the appropriate ten elements described in Appendix A of NUREG-1800 are provided below.

Scope of Program

The Fuse Holder Inspection (FHI) Program applies to fuse holders located outside of active devices that have aging effects requiring management.

Preventive Actions

The FHI Program is a condition monitoring program, which requires regular inspection of in-scope components and identification of degraded conditions that would affect the ability of the component to perform its intended function. Consequently, there are no specific preventive actions associated with this program other than the identification of the aging effects of concern before a loss of intended function occurs.

Parameters Monitored/Inspected

Monitored parameters will include high resistance of the metallic clamp (or clip) portion of the fuse holder. This will detect fatigue caused by ohmic heating, thermal cycling, electrical transients, mechanical stress, chemical contamination, corrosion and oxidation.

Detection of Aging Effects

Fuse holders will be tested at least once every 10 years. Testing will include thermography, contact resistance testing, or other appropriate testing methods. This is an adequate period to preclude failures of the fuse holders since experience has shown that aging degradation is a slow process. A 10-year inspection frequency will provide two data points during a 20-year period, which can be used to characterize degradation rate. The first tests for license renewal will be completed prior to the period of extended operation.

Monitoring and Trending

Monitoring and trending will not be used for this AMP. See "Exceptions to NUREG-1800," below.

Acceptance Criteria

The specific type of test to be performed, and the specific fuse holder tested will define the acceptance criteria for each test.

Corrective Actions

Corrective actions are documented using the DER process. The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the NMPNS commitment to the corrective action criteria of 10 CFR 50, Appendix B (Reference 3). The NMPNS Corrective Action Program includes the identification and correction of conditions adverse to quality and the identification, cause determination, correction, and actions to minimize recurrence for significant conditions adverse to quality.

Confirmation Process

The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the confirmation process for NMPNS under the corrective action criterion. At NMPNS, the confirmation process is implemented through Corrective Action Effectiveness Reviews and is performed for significant conditions adverse to quality and selected hardware related conditions adverse to quality. The Corrective Action Program includes, but is not limited to, safety-related, non-safety related and fire protection SSCs. Therefore, those SSCs required to be in-scope for License Renewal are addressed as part of the current Corrective Action Program.

Administrative Controls

The Fuse Holder Inspection Program will be implemented through documents that are subject to administrative controls. The administrative controls for NMPNS are discussed in the plant's Conduct of Operations description (Section XIII in Reference 12 and Chapter 13 in Reference 13) and the Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13).

Operating Experience

The Fuse Holder Inspection Program is a new program at NMPNS; therefore, no programmatic operating experience is available. As operating experience is obtained, lessons learned will be used to adjust this program as needed.

Exceptions to NUREG-1800

Program Elements Affected

Monitoring and Trending:

Analytical trending will not be included in this activity because the parameters monitored may vary depending upon the test method selected. This exception is consistent with most recent industry and regulatory License Renewal precedence.

Enhancements

None

Conclusion

There is reasonable assurance that aging effects will be managed by the implementation of the Fuse Holder Inspection Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.36 BOLTING INTEGRITY PROGRAM

Program Description

The Bolting Integrity Program manages aging effects due to loss of preload, cracking and loss of material of bolting within the scope of license renewal including safety-related bolting, bolting for NSSS component supports, bolting for other pressure retaining components, and structural bolting. Program activities include periodic inspections of bolting for indication of loss of preload, cracking and loss of material due to corrosion, rust, etc. This program is based on the guidelines delineated in NUREG-1339 and the guidance contained in EPRI NP-5769, with exceptions noted in NUREG-1339, for safety-related bolting and EPRI TR-104213 for other bolting.

The Bolting Integrity Program is implemented throught the ASME Section XI Inservice Inspection (Subsection IWB, IWC, IWD) Program, ASME Section XI Inservice Inspection (Subsection IWE) Program, ASME Section XI Inservice Inspection (Subsection IWF) Program, Structures Monitoring Program, Preventive Maintenance Program, and Systems Walkdown Program.

NUREG-1801 Consistency

The Bolting Integrity Program is an existing program that, when enhanced, will be consistent with NUREG-1801, Section X1.M18 (Bolting Integrity).

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the Bolting Integrity Program include establishing an augmented inspection program for high-strength bolts in NSSS supports, and revisions to existing activities that are credited for license renewal as discussed in more detail below.

Program Elements Affected

Prepare or revise applicable existing documents to ensure that the documents address the following elements:

Scope of Program

The Structures Monitoring, Preventive Maintenance and Systems Walkdown Programs will be enhanced to include requirements to inspect bolting for indication of loss of preload, cracking, and loss of material, as applicable.

Include in NMP administrative and implementing program documents references to the Bolting Integrity Program and Industry guidance.

Detection of Aging Effects

Establish an augmented inspection program for high-strength (actual yield strength ≥ 150 ksi) bolts. This augmented program will prescribe the examination requirements of Tables IWB-2500-1 and IWC-2500-1 of ASME Section SI for high-strength bolts in the class 1 and class 2 component supports, respectively.

Enhancements will be completed prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience related to the Bolting Integrity Program and is aware of the types of bolting issues that have been reported and documented in the industry. The lessons learned from the industry experiences have been incorporated into the NMPNS bolting practices such that this program has adequately detected bolting integrity issues and has been effective in correcting issues prior to the loss of intended function. This program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Bolting Integrity Program has been effective in managing the aging effects of bolting within the scope of license renewal including safety-related bolting, bolting for NSSS component supports, and bolting for other pressure retaining components.

Therefore, there is reasonable assurance that aging effects will be managed by the implementation of the Bolting Integrity Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.37 BWR CONTROL ROD DRIVE RETURN LINE (CRDRL) NOZZLE PROGRAM

Program Description

The NMP1 CRDRL Nozzle is examined in accordance with ASME Code, Section XI, program which satisfies the requirements in NUREG-1801, Program XI.M1, "ASME Section XI Inservice Inspection, Subsections IWB, IWC and IWD" as described in Section B2.1.1. This program is updated in accordance with 10CFR50.55a. Augmented examinations incorporated into the ISI program plan that implemented the requirements of NUREG-0619, "BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking", November 1980, have been superseded by ASME Section XI, Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," (1995 Edition with the 1996 Addenda).

NMP2 cut and capped the CRD return nozzle prior to commercial operation. The capped NMP2 CRD return nozzle was therefore not subject to the augmented examination requirements described in NUREG-0619. The NMP2 CRDRL Nozzle Program is implemented through ASME Section XI, Subsection IWB, Table IWB 2500-1 (1989 edition no addenda) and ASME Section XI, Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," (1995 Edition with the 1996 Addenda).

NUREG-1801 Consistency

The NMP1 CRDRL Nozzle Program is an existing program that satisfies the requirements of Section XI.M6, "BWR Control Rod Drive Return Line Nozzle," of NUREG-1801 with the three exceptions described below:

The first exception is to the Program Description in NUREG-1801, Section XI.M6, and involves the edition of the ASME Code used as the basis for the Section XI requirements. NUREG-1801, Section XI.M6, identifies the 1995 edition (including the 1996 addenda) of ASME Section XI as the basis for the GALL CRDRL nozzle program. The NMP Inservice Inspection (ISI) Program will not comply with the Edition and Addenda of ASME Section XI cited in the GALL because the program is updated to the latest Edition and Addenda of ASME Section XI, as mandated by 10 CFR 50.55a, prior to the start of each inspection interval. The acceptability of the existing NMP1 CRDRL nozzle program in meeting the augmented inspection requirements established in NUREG 0619 is documented in NRC Safety Evaluation Report dated 02/05/1999 (Reference 42).

The second and third exceptions are to the Detection of Aging Effects and Monitoring and Trending sections of NUREG-1801, *Section XI.M6*. These exceptions involve the inspection method and frequency for performing the augmented inspection requirements in NUREG 0619. In lieu of dye penetrant (PT) examination every sixth refueling outage or 90 startup/shutdown cycles, whichever comes first, NMP1 performs enhanced ultrasonic examination every 10 years.

The exceptions were found acceptable in NRC Safety Evaluation Report dated 2/05/1999 (Reference 42). As mandated by 10 CFR 50.55a, ultrasonic examinations are performed in accordance with ASME Section XI, Appendix VIII 1995 Edition with the 1996 Addenda.

Program Element Exceptions

Program Description, Detection of Aging Effects, Monitoring and Trending, and Acceptance Criteria

The three exceptions to NUREG-1801, Section XI.M6, are: 1) the NMP Inservice Inspection (ISI) Program does not comply with the specific Edition and Addenda of ASME Section XI cited in the GALL because the program is updated to the latest Edition and Addenda of ASME Section XI, as mandated by 10 CFR 50.55a, prior to the start of each inspection interval; 2) the NMP program uses enhanced ultrasonic inspection techniques instead of PT inspections to satisfy the recommendations of NUREG-0619 (now superceded by Appendix VIII to ASME Section XI, Division 1, 1995 Edition with the 1996 Addenda); and, 3) the NMP program uses an inspection frequency of every 10 years versus every sixth refueling outage or 90 startup/shutdown cycles specified in NUREG-0619. Each of these exceptions has been evaluated and the determination made that the NMP1 CRDRL nozzle program adequately manages the effects of aging on the CRDRL. NMP has evaluated each of these exceptions and determined that the NMP1 CRDRL nozzle program conforms to the intent of NUREG-1801, Section XI.M6.

Enhancements

None

Operating Experience

Ultrasonic examinations of the Unit 1 CRDRL nozzle performed during refueling outages using automated test equipment qualified in accordance with Appendix VIII to ASME Section XI, Division 1, 1995 Edition with the 1996 Addenda, found no indications. The ultrasonic examination using automated test equipment has been demonstrated to be capable of reliably detecting flaws greater than or equal to a 0.25 inch depth.

No industry experience was identified that indicates that existing programs and practices will not be effective in the timely identification of CRDRL nozzle cracking.

Conclusion

The existing NMP1 CRDRL Nozzle Program, examination every 10 years, provides a high degree of assurance that CRDRL nozzle cracks will be detected prior to exceeding the ASME Section XI allowables.

B2.1.38 PROTECTIVE COATING MONITORING AND MAINTENANCE PROGRAM

Program Description

The NMP Protective Coating Monitoring and Maintenance Program is an existing program that is described in the NMP1 and NMP2 responses to GL 98-04, "Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System after a Loss-Of-Coolant Accident because of Construction and Protective Coating Deficiencies and Foreign Material in Containment." The NMP program was developed in accordance with ANSI N101.4-1972 referenced in RG 1.54, June 1973, along with ANSI/ASME NQA-1-1983. The NMP program is a "comparable program" as described in NUREG-1801 (GALL), Chapter XI, Program XI.S8, Protective Coating Monitoring and Maintenance Program, which is an acceptable aging management program for license renewal.

The NMP program applies to Service Level 1 protective coatings inside the NMP1 primary containment and items within the torus (outside surface of the vent (ring) header and downcomer, inside surface of the vent piping, ring header, vent header junctions, and downcomers) and the NMP2 primary containment. The NMP2 suppression pool (wetwell) is not included because it is primarily stainless steel and does not have Service Level 1 coatings. Coating conditions monitored by this program include blistering, cracking, peeling, loose rust, and physical/mechanical damage. When localized degradation of a coating is identified, the affected area is evaluated by Engineering and is scheduled for repair, replacement, or removal, as needed. The condition assessments and resulting repair, replacement, or removal activities ensure that the amount of coatings subject to detachment from the substrate during a LOCA is minimized to ensure post-accident operability of the ECCS suction strainers.

For NMP1, the procurement, application, and inspection of new coatings and the repair and replacement of existing coatings are subject to the requirements of ANSI N101.4-1972 and ANSI/ASME NQA-1-1983. Coating condition assessments are conducted every refueling outage and include Service Level 1 coatings inside the primary containment and areas inside the torus such as the vent header and downcomer.

For NMP2, monitoring and maintaining protective coatings inside the primary containment are subject to the requirements of ANSI N101.2-1972, ANSI N101.4-1972, ANSI N5.12-1974, Regulatory Guide 1.54, June 1973, and ANSI/ASME NQA-1-1983. Coating condition assessments of Service Level 1 coatings inside the primary containment (drywell) are also conducted every refueling outage.

NUREG-1801 Consistency

The Protective Coating Monitoring and Maintenance Program is an existing program that takes exception to certain NUREG-1801, Section XI.S8 (Protective Coating Monitoring and Maintenance Program) evaluation elements, and requires enhancement to be consistent with others.

Exceptions to NUREG-1801

The NMP1 and NMP2 Protective Coating Monitoring and Maintenance Programs are not credited in the LR application for the prevention of corrosion of carbon steel components in the containment. The program monitors for rust that is not intact because it is a potential debris source for ECCS suction strainers.

The Protective Coating Monitoring and Maintenance Program will be enhanced following the guidance within ASTM D 5163-05a instead of ASTM D 5163-96 as specified in NUREG-1801, Section XI.S8. This is acceptable because ASTM D 5163-05a is the most recent issued standard and incorporates the latest industry guidance on protective coatings.

The Protective Coating Monitoring and Maintenance Program will vary the guidance within ASTM D5163-05a, paragraph 10.2.2 and 10.2.3 in regards to the measurement of cracks and peeling coating. Rather, NMP will use visual methods to estimate the size of any defective areas.

Program Elements Affected

Preventive Actions

The Protective Coating Monitoring and Maintenance Programs are not credited in the License Renewal Application for prevention of corrosion of carbon steel.

Operating Experience

The Protective Coating Monitoring and Maintenance Programs are not credited in the License Renewal Application for prevention of corrosion of carbon steel.

Acceptance Criteria

Once an area has been identified that has cracks, peeling, or delaminated coating, visual estimation techniques will be used to quantify the surface area. Conservative estimates will be made using known structural dimensions. This is acceptable for the purposes of quantifying the total amount of degraded coatings.

Enhancements

Program administrative controls will be enhanced to incorporate specific details consistent with requirements in ASTM D 5163-05a.

Program Elements Affected

Parameters Monitored/Inspected

Program administrative controls will be enhanced to specify the visual examination of coated surfaces for any visible defects includes blistering, cracking, flaking, peeling, and physical or mechanical damage.

Detection of Aging Effects

Program administrative controls will be enhanced to: (1) perform periodic inspection of coatings every refueling outage versus every 24 months; (2) set minimum qualifications for inspection personnel, the inspection coordinator, and the inspection results evaluator; (3) perform thorough visual inspections in areas noted as deficient concurrently with the general visual inspection; (4) specify the types of instruments and equipment that may be used for the inspection.

Monitoring and Trending

Program administrative controls will be enhanced to require: (1) pre-inspection reviews of the previous two monitoring reports before performing the condition assessment; (2) establishment of guidelines for prioritization of repair areas and monitoring these areas until they are repaired.

Acceptance Criteria

The program administrative controls will be enhanced to require that the inspection results evaluator determine which areas are unacceptable and initiate corrective action.

Enhancements will be completed prior to the period of extended operation.

Operating Experience

NMP has implemented a Protective Coating Monitoring and Maintenance Program consistent with the response to GL 98-04. The response to GL 98-04 described program attributes, including design and licensing basis, procurement, control of coating application, quality assurance, monitoring, and maintenance of Service Level 1 coatings.

Industry operating experience events pertaining to Service Level 1 coatings are evaluated for applicability to NMP. If determined to be applicable, these events are entered into the site Corrective Action program for determining any required corrective or preventive actions.

Conclusion

Continued implementation of the Protective Coating Monitoring and Maintenance Program will provide reasonable assurance that the aging effects will be managed such that Service Level 1 coatings will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.39 NON-EQ ELECTRICAL CABLE METALLIC CONNECTIONS INSPECTION PROGRAM

Program Description

The Non-EQ Electrical Cable Metallic Connections Inspection Program is a new plant-specific program that addresses the ten elements described in Appendix A of NUREG-1800 (Reference 1) as well as the most recent industry and regulatory License Renewal precedence.

Most electrical connections involve insulating material and metallic parts. This program will address the aging effects of the metallic parts used to connect cable conductors to other cables or electrical devices. The program described in Section B2.1.29, Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements, will address the aging effects of the cable insulation material.

The electrical connections used in nuclear power plants include: splices (butt or bolted), crimp-type ring lugs, and terminal blocks. The aging stressors to these connections addressed by this program include: thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation. The specific mechanism for each of these aging stressors is described in the most recent industry and regulatory License Renewal precedence.

The specific type of test performed will be determined prior to the initial test, and will be a proven test for detecting loose connections, such as thermography, contact resistance testing, or other appropriate testing.

Scope of Program

The Non-EQ Electrical Cable Metallic Connections Inspection Program applies to the metallic portion of Non-EQ electrical cable connections that have aging effects requiring management.

Preventive Actions

The Non-EQ Electrical Cable Metallic Connections Inspection Program is a condition monitoring program, which requires regular inspection of in-scope components and identification of degraded conditions that would affect the ability of the component to perform its intended function. Consequently, there are no specific preventive actions associated with this program other than the identification of the aging effects of concern before a loss of intended function occurs.

Parameters Monitored/Inspected

Monitored parameters will include loosening of bolted connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation.

This program will test a representative sample to provide an indication of the integrity of the connections. The following factors will be considered for sample selection: application voltage (high, medium, and low), circuit loading, and location (high temperature, high humidity, vibration, etc.). The technical basis for the sample selected will be documented.

Detection of Aging Effects

The metallic portion of Non-EQ electrical cable connections will be tested using thermography, contact resistance testing, or other appropriate testing methods. The initial inspections conducted to support license renewal will be completed prior to the period of extended operation. Thereafter, a 10-year inspection frequency will be used to provide at least two data points during the 20-year period of extended operation. This frequency is adequate to preclude failures of the metallic portion of Non-EQ electrical cable connections because experience has shown that aging degradation is a slow process.

Monitoring and Trending

Monitoring and trending will not be used for this AMP. See "Exceptions to NUREG-1800," below.

Acceptance Criteria

The specific type of test to be performed and the specific Non-EQ electrical cable metallic connection tested will define the acceptance criteria for each test.

Corrective Actions

Corrective actions are documented using the DER process. The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the NMP commitment to the corrective action criteria of 10 CFR 50, Appendix B (Reference 3). The NMP Corrective Action Program includes the identification and correction of conditions adverse to quality and the identification, cause determination, correction, and actions to minimize recurrence for significant conditions adverse to quality.

Confirmation Process

The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the confirmation process for NMP under the corrective action criterion. At NMP, the confirmation process is implemented through Corrective Action Effectiveness Reviews and is performed for significant conditions adverse to quality and selected hardware related conditions adverse to quality. The Corrective Action Program includes, but is not limited to, safety-related, non-safety related and fire protection SSCs. Therefore, those SSCs required to be in-scope for License Renewal are addressed as part of the current Corrective Action Program.

Administrative Controls

The Non-EQ Electrical Cable Metallic Connections Inspection Program will be implemented through the administrative controls for NMP which are discussed in the plant's Conduct of Operations description (Section XIII in Reference 12 and Chapter 13 in Reference 13) and the Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13).

Operating Experience

The Non-EQ Electrical Cable Metallic Connections Inspection Program is a new program at NMP; therefore, no programmatic operating experience is available. As operating experience is obtained, lessons learned will be used to adjust this program as needed.

Exceptions to NUREG-1800

NMP will develop the Non-EQ Electrical Cable Metallic Connections Inspection Program to be consistent with the most recent industry and regulatory License Renewal precedence. Analytical trending will not be included in this program because the parameters monitored may vary depending upon the test method selected. This is an exception to the "Monitoring and Trending" element in Appendix A of NUREG-1800.

Conclusion

The Non-EQ Electrical Cable Metallic Connections Inspection Program is a condition monitoring program that will require regular inspection of in-scope components. This program will ensure that degraded conditions that would affect the ability of the Non-EQ electrical cable metallic connections to perform their intended function are identified. Therefore, this program will provide a reasonable assurance that electrical metallic connections will continue to perform their intended function throughout the period of extended operation.

B2.1.40 WOODEN POWER POLE INSPECTION PROGRAM (UNIT 2 ONLY)

Program Description

The NMP Wooden Power Pole Inspection Program is a new plant-specific program that manages the aging of wooden power poles that are within the scope for license renewal because they provide structural support for the transmission lines in the recovery path for station blackout. Qualified personnel perform inspections, conducted prior to the period of extended operation and every 10 years thereafter, that manage material loss, degradation, and physical damage. Activities include visual inspections of the entire structure, including cross members and hardware, pole soundings, circumferential measurements, and below grade inspections. If necessary, core boring, application of preservatives, and pesticide treatments are performed if soundings suggest degradation has occurred. Corrective actions may include pole reinforcement or replacement. The program inspection activities ensure that in-scope electrical support structures retain their intended functions between inspection cycles.

Aging Management Program Elements

The key elements of aging management activities are used in the Wooden Power Pole Inspection Program are described below. The results of an evaluation of each key element against the appropriate ten elements described in Appendix A of NUREG-1800 are provided below.

Scope of Program

Wooden power poles relied upon for recovery from station blackout have been identified to be within the scope of LR and subject to aging management review. The program will include visual inspections of the entire structure, pole sounding and circumference measurements, below grade inspections, any necessary core boring, preservative application, and pesticide treatments.

Preventative Actions

The Wooden Power Pole Inspection Program is a condition monitoring program as described in Appendix A.1.1 of NUREG-1800. The program will provide for timely detection of loss of material and degradation, and physical damage and does not support preventive or mitigating actions.

Parameters Monitored/Inspected

Wooden power poles will be inspected for material loss, degradation, and physical damage. Techniques include visual examinations of the entire structure, including cross members and hardware, pole soundings, circumferential measurements, and below grade inspections. If necessary, core boring, preservative applications, and pesticide treatments are performed if soundings suggest degradation has occurred. Visual inspections will check the pole for physical or mechanical damage that can limit/affect the life of the pole (lean or tilt, splitting or cracked tops, changes to grade, and shell or butt rot and decay). Excavations will be performed to a depth of approximately 18" to detect loss of material and/or material degradation or damage. Pole sounding will be performed by a qualified inspector at various pole locations to detect internal rot/decay, insect damage or infestations, or hollow areas. Core boring of the pole may be performed based on the inspection and sounding results to detect internal decay, insect infestation, or hollow voids. If insect infestation is found, the area will be treated with a fumigant prior to plugging the bored core region. Preservative treatment of the excavated surfaces (include moisture barrier/wrapping) will also be performed prior to recovering. Effective circumference measurements evaluate the pole loading capacity.

The program also monitors proper pole tagging and labeling requirements, which contain treatment information and application dates.

Detection of Aging Effects

The inspections outlined in the new program shall be completed by qualified personnel on the in scope components within five (5) years of the expiration of the current operating license. Subsequent visual inspections and testing for the wooden poles will be performed every ten (10) years. This frequency is based on industry experience, which has shown that although the typical wooden pole life is expected to be 30-40 years, routine inspection and treatment can extend this life by 50% or more. Typical industry inspection frequencies for wooden poles currently range from 8-15 years.

The 10-year visual inspections and testing will detect degradation and identify deficiencies before there is a loss of intended function(s). All inspections will provide the level of detail and examination necessary to ensure that intended functions are preserved through each subsequent inspection cycle.

Monitoring and Trending

The program shall detail the retention of all previous inspection results and records. These records are identified as plant records and available for review during the subsequent inspection cycle. Reviews of previous inspection results will provide for trending of long-term degradation or deterioration. This information could also help in evaluating the potential for degradation during the period before the next inspection cycle.

Additionally, the program shall provide direction for appropriate engineering reviews of the completed inspection results. Although the inspections may be performed by an outside vendor or contractor or by NMP personnel, in-house reviews of the results shall be performed to confirm that the wooden poles are capable of continuing to perform their intended functions through the next inspection cycle.

Acceptance Criteria

The program will detail qualification and experience requirements for personnel performing the inspections, where experience in the inspection, treatment, and reinforcement of wooden power poles is required. If the inspections are contracted to an outside vendor or contractor, the activity identifies all required personnel qualifications, including minimum years of experience, licensed pesticide applicator certifications, and wood treatment and fumigant qualifications. All work performed by NMP or a vendor/ contractor shall be noted as being performed to the criteria and/or standards stated in the NMP activity and through site specific, approved procedures.

Additionally, the program will detail the inspection methods with any applicable acceptance/rejection criteria. Any pole found to have loss of material or degradation, or physical damage will be assessed and treated. The capability of a degraded pole to continue performing load carrying intended functions will be evaluated. Additionally, the program will identify and label wooden poles warranting either immediate rejection due to dangerous conditions, as well as those with serious but lesser defects requiring repair, reinforcement, or non-emergent replacement. All poles that have been classified as 'rejected' or 'danger' shall be immediately labeled or tagged during the inspection denoting the severity level of degradation.

Corrective Actions

The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the NMPNS commitment to the corrective action criteria of 10 CFR 50, Appendix B (Reference 3). The Wooden Power Pole Inspection Program will direct use of the site corrective action program when conditions adverse to quality are identified. These actions include evaluations of adverse or degraded conditions and wooden pole reinforcement or replacement.

Confirmation Process

The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the confirmation process for NMPNS under the corrective action criterion. At NMPNS, the confirmation process is implemented through Corrective Action Effectiveness Reviews and is performed for significant conditions adverse to quality and selected hardware related conditions adverse to quality. The Corrective Action Program includes, but is not limited to, safety-related, non-safety related and fire protection SSCs. Therefore, those SSCs required to be in-scope for License Renewal are addressed as part of the current Corrective Action Program.

Administrative Controls

The Wooden Power Pole Inspection Program will be implemented through department administrative procedures which are subject to the 10 CFR 50 Appendix B administrative controls program.

The administrative controls for NMPNS are discussed in the plant's Conduct of Operations description (Section XIII in Reference 12 and Chapter 13 in Reference 13) and the Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13).

Operating Experience

The program is defined and implemented for LR, thus no plant specific operating experience currently exists. A review of the corrective action process reports yielded no reports applicable to wooden pole aging or degradation. Inspection scheduling and performance, as discussed in the other NUREG-1800 attributes, will provide plant-specific inspection data and experience prior to the end of the current operating license. These results and the AMP experience, along with industry experience, will provide timely awareness of emerging aging issues as well as provide a basis for evaluating the program effectiveness and the need for program adjustments.

Exceptions to NUREG-1800

None

Enhancements

None

Conclusion

The new Wooden Power Pole Inspection Program will ensure that the effects of aging associated with the in-scope components will be adequately managed so that there is reasonable assurance that their intended functions will be maintained consistent with the current licensing basis throughout the period of extended operation.

B3.0 TLAA EVALUATION OF AGING MANAGEMENT PROGRAMS UNDER 10 CFR 54.21(c)(1)(iii)

The correlation between NUREG-1801 (Section X) programs and NMPNS programs is shown below. For the NMPNS Programs, links to appropriate sections of this appendix are provided.

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	NINE MILE POINT PROGRAM
X.M1	Metal Fatigue of Reactor Coolant Pressure Boundary	Fatigue Monitoring Program (Section B3.2)
X.S1	Concrete Containment Tendon Prestress	Not applicable. The NMP1 and NMP2 containments do not have prestressed concrete containment designs.
X.E1	Environmental Qualification (EQ) of Electrical Components	Environmental Qualification Program (Section B3.1)
NA	Plant-Specific Program	Torus Corrosion Monitoring Program (NMP1 only) (Section B3.3)

B3.1 ENVIRONMENTAL QUALIFICATION PROGRAM

Program Description

The EQ Program is an existing program that manages thermal, radiation, and cyclical aging for electrical equipment important to safety and located in harsh plant environments at NMPNS. At NMP2, the EQ Program also manages these effects for active safety-related mechanical equipment located in harsh plant environments. Program activities (1) identify applicable equipment and environmental requirements; (2) establish, demonstrate, and document the level of qualification (including configuration, maintenance, surveillance, and replacement requirements); and (3) maintain (or preserve) qualification. The EQ Program employs aging evaluations based on 10 CFR 50.49(f) qualification methods. Components in the EQ Program must be refurbished, replaced, or have their qualification extended prior to reaching the aging limits established in the evaluation. Aging evaluations for environmentally qualified components that specify a qualification of at least 40 years are considered TLAAs for LR. The EQ Program ensures that these SSCs are maintained within the bounds of their qualification bases.

NUREG-1801 Consistency

The EQ Program is an existing program that is consistent with NUREG-1801, Section X.E1 [Environmental Qualification (EQ) of Electrical Components] (Reference 2).

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The NMPNS EQ Program started in 1980 as a project at NMP1, and was developed as an integral part of construction at NMP2. Since its inception, consideration of plant and industry operating experience has been an important element of the EQ Program. Recorded measurements of ambient temperature have been used to define conditions for some harsh environments, and records of representative actual temperatures have been used as preliminary data to resolve concerns for certain terminal blocks installed in the NMP1 drywell. Qualified life evaluations for certain sealing materials and lamp assemblies were reevaluated to remove excess conservatism and eliminate unnecessary maintenance activities.

The NRC has resolved Generic Safety Issue (GSI) 168, which is related to low-voltage EQ instrumentation and control cables, with no new requirements for licensees (Reference 14). Consistent with NRC guidance, no additional information is required to address GSI-168.

The EQ Program is continually adjusted to account for industry experience and research. Internal and external reviewers have performed assessments of the EQ Program. The program is evolving as administrative improvements have been identified to address issues such as communication and organizational transitions. A major program reconstitution effort began in 2003, in response to internal assessments, to improve the overall strength of the EQ Program. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The EQ Program has been effective in managing thermal, radiation, and cyclical aging for components within the scope of 10 CFR 50.49.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the EQ Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation. This result meets the requirements of 10 CFR 54.21(c)(1)(iii).

B3.2 FATIGUE MONITORING PROGRAM

Program Description

The Fatigue Monitoring Program (FMP) is an existing program that manages the fatigue life of reactor coolant pressure boundary components by tracking and evaluating key plant events. Events were selected based upon plant-specific evaluations of the most fatigue-limited locations for critical components, including those discussed in NUREG/CR-6260 (Reference 18). The FMP monitors operating transients to-date, calculates cumulative usage factors to-date, and directs performance of engineering evaluations to develop preventive and mitigative measures in order not to exceed the design limit on fatigue usage.

The effects of reactor coolant environment will be considered through the evaluation of, as a minimum, those components selected in NUREG/CR-6260 using the appropriate environmental fatigue factors.

The design basis metal fatigue analyses for the reactor coolant pressure boundary and certain primary containment structures and components are considered TLAAs for license renewal. 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. In order to determine cumulative usage factors (CUFs) more accurately, the FMP will implement FatiguePro fatigue monitoring software. This 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.

NUREG-1801 Consistency

The FMP is an existing program that will be consistent with NUREG-1801, Section X.M1 (Metal Fatigue of Reactor Coolant Pressure Boundary) (Reference 2), after enhancements are incorporated.

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the FMP encompass revisions to existing activities that will be credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Preventive Action - The FMP will be enhanced with guidance for the use of the FatiguePro software package and updated methodology for environmental fatigue factors in establishing updated fatigue life calculations for components.

Parameters Monitored or Inspected – Safety relief valve actuations will be added to the list of key plant events (transients) that are monitored for NMP1.

These enhancements will be completed prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the FMP. In instances where the potential existed to exceed CUFs before the end of plant life, the engineering analyses showed that actual margins were larger than initially estimated. A noteworthy result of these fatigue evaluations was the recognition that the FMP could benefit from the use of analytical fatigue software such as FatiguePro. DERs written in 2003 identified opportunities for programmatic improvement. This led to the establishment of a comprehensive FMP document, additional reviews of cycle records with an emphasis on NMP1, and a proposal for the implementation of fatigue analysis software.

The FMP is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The FMP has been effective in managing the effects of fatigue on the intended functions of long-lived passive SSCs. Program activities provide a proactive monitoring of fatigue stresses on key components chosen for their limiting nature on the design fatigue life of the plant.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the FMP such that SSCs WSLR will continue to perform their intended functions consistent with the CLB for the period of extended operation. This result meets the requirements of 10 CFR 54.21(c)(1)(iii).

B3.3 TORUS CORROSION MONITORING PROGRAM (NMP1 ONLY)

Program Description

The Torus Corrosion Monitoring Program is an existing plant-specific program that consists of the appropriate ten elements described in Appendix A of NUREG-1800 (Reference 1). The Torus Corrosion Monitoring Program manages corrosion of the NMP1 suppression chamber (torus) through inspection and analysis, and is based on a commitment to periodically monitor torus condition described in an NRC SER dated August 11, 1994 (Reference 19). The aging evaluation that specifies minimum wall thickness for the NMP1 torus shell is considered a TLAA for license renewal. The Torus Corrosion Monitoring Program ensures that the NMP1 torus wall and support structure thickness limits are not exceeded. (Note: this program only applies to NMP1 because NMP2 is a Mark II containment and does not have a torus).

Aging Management Program Elements

The key elements of aging management activities, which are used in the Torus Corrosion Monitoring Program, are described below. The results of an evaluation of each key element against the appropriate ten elements described in Appendix A of NUREG-1800 are provided below.

Scope of Program

The Torus Corrosion Monitoring Program manages aging effects for steel elements forming the NMP1 torus. The program provides for (1) determination of torus shell thickness through ultrasonic (UT) measurement; (2) determination of corrosion rate through analysis of material coupons; and (3) visual inspection of accessible external surfaces of the torus support structure for corrosion.

Preventive Actions

The Torus Corrosion Monitoring Program is a condition monitoring program; there are no specific preventive actions associated with this program.

Parameters Monitored/Inspected

The torus shell wall thickness is monitored through the torus UT measurement activities and the torus coupon analysis activities Additionally, the condition of the torus external support structure is monitored by visual inspection to identify corrosion or any deficient condition.

Detection of Aging Effects

The torus shell and the torus external support structure are periodically inspected for loss of material through a combination of thickness measurements, coupon analysis, and visual examination. The torus shell thickness is measured using UT methods. The torus shell corrosion rate is determined through the torus coupon analysis activity where coupons are periodically removed, analyzed, and compared to the results of the UT measurement activity. Torus wall UT measurements are obtained at approximately six-month intervals over a predefined grid system, and corrosion sample coupons are analyzed during each refueling outage. Corrosion rates are determined through analysis of both data sets, and the most conservative corrosion rate for a particular torus bay is used to evaluate aging of the structure. Monitoring in this manner ensures the torus shell material will not be reduced to less than the minimum required wall thickness, and that any degradation is detected before there is a loss of intended function.

Monitoring and Trending

The measurement activities described above are performed on a predefined schedule; thus, corrosion and thickness data for the torus shell are collected and analyzed over time. The UT results and corrosion rate data are trended and retained for future reference. The corrosion rate data is analyzed to determine the most conservative corrosion rate for a particular torus bay. Torus external support structure visual inspection findings are compared to the results of previous inspections.

Acceptance Criteria

The Torus Corrosion Monitoring Program establishes acceptance criteria for local thickness, average Torus wall thickness and corrosion rate. The minimum wall thickness and corrosion rate limits are defined to ensure that the minimum wall thickness requirement will not be violated before the next scheduled inspection. Degradation of Torus external support structure components is evaluated to ensure intended functions are not compromised before the next scheduled inspection.

Corrective Actions

Corrective actions are documented using the DER process. The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the NMPNS commitment to the corrective action criteria of 10 CFR 50, Appendix B (Reference 3). The NMPNS Corrective Action Program includes the identification and correction of conditions adverse to quality and the identification, cause determination, correction, and actions to minimize recurrence for significant conditions adverse to quality.

Confirmation Process

The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the confirmation process for NMPNS under the corrective action program. At NMPNS, the confirmation process is implemented through Corrective Action Effectiveness Reviews and is performed for significant conditions adverse to quality and selected hardware related conditions adverse to quality. The Corrective Action Program includes, but is not limited to, safety-related, non-safety related and fire protection SSCs. Therefore, those SSCs required to be WSLR are addressed as part of the current Corrective Action Program.

Administrative Controls

The Torus Corrosion Monitoring Program is implemented through documents that are subject to administrative controls. The administrative controls for NMP1 are discussed in the plant's Conduct of Operations description (Section XIII in Reference 12) and the Quality Assurance Program Topical Report (Appendix B to Reference 12).

Operating Experience

Torus wall thinning was observed in the late 1980s following an extended plant shutdown. The wall thinning was attributed to the layup conditions inside the Torus during the extended shutdown. In lieu of various proposed modifications to cope with this plant-specific operating experience, the NRC approved the NMP1 Torus Corrosion Monitoring Program in an SER dated August 25, 1992 (Reference 37). The NRC approved updates to the program in an SER dated August 11, 1994 (Reference 38).

Review of plant-specific operating experience revealed no discrepancies related to Torus Corrosion Monitoring Program examinations. The Torus Corrosion Monitoring Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Exceptions to NUREG-1800

None

Enhancements

None

Conclusion

The Torus Corrosion Monitoring Program has been effective in maintaining the intended function of the NMP1 torus shell and associated support structure. Program evaluations sufficiently demonstrate that the torus shell material will not be reduced to less than the minimum required wall thickness in any future operation.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Torus Corrosion Monitoring Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation. This result meets the requirements of 10 CFR 54.21(c)(1)(iii).

B4.0 REFERENCES

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2. NUREG-1801, *Generic Aging Lessons Learned (GALL) Report*, July 2001.
3. 10 CFR 50 Appendix B, *Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants.*
4. EPRI TR-103515-R1, *BWR Water Chemistry Guidelines – 1996 Revision*, December 1996.
5. EPRI NSAC-202L-R2, *Recommendations for an Effective Flow-Accelerated Corrosion Program*, April 1999.
6. EPRI TR-107396, *Closed Cooling Water Chemistry Guideline*, October 1997.
7. ASTM E-185, *Standard Recommended Practice for Surveillance Tests for Nuclear Reactor Vessels.*
8. NEI 94-01, Revision 0, *Industry Guideline for Implementing Performance Based Option of 10 CFR Part 50*, Appendix J, July 26, 1995.
9. NUMARC 93-01, Revision 2, *Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants*, May 1993.
10. NEI 96-03, Revision D, *Guideline for Monitoring the Condition of Structures at Nuclear Power Plants*, July 1996.
11. Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated May 31, 2001, *Subject: Nine Mile Point Nuclear Station, Unit No. 2 – Approval to Use a Risk-Informed Inservice Inspection Program for the Second 10-Year Interval (TAC No. MB2097).*
12. Nine Mile Point Nuclear Station Unit 1 Final Safety Analysis Report (Updated), Revision 18.
13. Nine Mile Point Nuclear Station Unit 2 Updated Safety Analysis Report, Revision 15.
14. Memorandum from R. William Borchardt (Office of Nuclear Reactor Regulation) to William D. Travers (Executive Director for Operations) dated August 14, 2003, *Closeout of Generic Safety Issue (GSI) 168, Environmental Qualification of Low-Voltage Instrumentation and Control Cables.*
15. NUREG-0612, *Control of Heavy Loads at Nuclear Power Plants*, July 1980.

16. Regulatory Guide 1.163, *Performance-Based Containment Leak-Test Program*, September 1995.
17. Regulatory Guide 1.160, *Monitoring the Effectiveness of Maintenance at Nuclear Power Plants*, January 1995.
18. NUREG/CR-6260, *Application of NUREG/CR-5999 Interim Fatigue Curves to Selected Nuclear Power Plant Components*, February 1995.
19. 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).*
20. EPRI TR-109619, *Guideline for the Management of Adverse Localized Equipment Environments*, June 1999.
21. IEEE Std. P1205-2000, *IEEE Guide for Assessing, Monitoring, and Mitigation Aging Effects on Class 1E Equipment Used in Nuclear Power Generating Stations.*
22. NUREG/CR-5643, *Insights Gained from Aging Research*, March 1992.
23. SAND 96-0344, *Aging Management Guideline for Commercial Nuclear Power Plants- Electric Cables and Terminations*, September 1996.
24. Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated October 5, 2000, *Subject: Nine Mile Point Nuclear Station, Unit No. 1 – Reliefs for the Third 10-Year Inservice Inspection Program Plan, Revision 1 (TAC No. MA7129).*
25. Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated March 3, 2000, *Subject: Nine Mile Point Nuclear Station, Unit No. 2 – Reliefs for the Second 10-Year Inservice Inspection Program Plan, Revision 1 (TAC No. MA6273).*
26. Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated September 18, 1998, *Subject: Issuance of Amendment for Nine Mile Point Nuclear Station, Unit No. 1 (TAC No. M99130).*
27. DELETED
28. EPRI TR-103515-R2, *BWR Water Chemistry Guidelines – 2000 Revision*, February 2000.
29. Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated August 17, 2000, *Subject: Nine Mile Point Nuclear Station, Unit Nos. 1 and 2 – Relief from the Requirements of 10 CFR 50.55a Related to Containment Inspection (TAC Nos. MA7116, MA7117, and MA7118).*

30. Letter from Nine Mile Point Nuclear Station, LLC, (NMP1L 1804) to U.S. Nuclear Regulatory Commission dated January 29, 2004, *Subject: Nine Mile Point Unit 1, Docket No. 50-220, Facility Operating License No. DPR-63 – License Amendment Request: Revision to the Reactor Pressure Vessel Material Surveillance Program.*

31. Letter from Nine Mile Point Nuclear Station, LLC, (NMP2L 2109) to U.S. Nuclear Regulatory Commission dated January 29, 2004, *Subject: Nine Mile Point Unit 2, Docket No. 50-410, Facility Operating License No. NPF-69 – License Amendment Request: Revision to the Reactor Pressure Vessel Material Surveillance Program.*

32. Letter from U.S. Nuclear Regulatory Commission to BWRVIP Chairman dated February 1, 2002, *Subject: Safety Evaluation Regarding ERPI Proprietary Reports "BWR Vessel and Internals Project, BWR Integrated Surveillance Program Plan (BWRVIP-78)" and "BWRVIP-86: BWR Vessel and Internals Project, BWR Integrated Surveillance Program Implementation Plan".*

33. EPRI TR-1007824, *BWRVIP-116: BWR Vessel and Internals Project, Integrated Surveillance Program (ISP) Implementation for License Renewal*, July 2003.

34. Letter from Nine Mile Point Nuclear Station, LLC, (NMP1L 1748) to U.S. Nuclear Regulatory Commission dated July 23, 2003, *Subject: Subject: Nine Mile Point Unit 1, Docket No. 50-220, Facility Operating License No. DPR-63 – Submittal of Inservice Inspection Owners Activity Reports.*

35. Letter from Niagara Mohawk Power Corporation (NMP2L 1976) to U.S. Nuclear Regulatory Commission dated July 18, 2000, *Subject: Inservice Inspections (ISI) Summary Report.*

36. Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated August 13, 1996, *Subject: Issuance of Amendment for Nine Mile Point Nuclear Station, Unit 2 (TAC No. M94641).*

37. Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated August 25, 1992, *Subject: Proposed Deferment of Nine Mile Point Nuclear Station Unit No. 1 Torus Modifications (TAC No. M80214).*

38. 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).*

39. Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated March 30, 2000, *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).*

40. Regulatory Guide 1.147, Revision 13 (reprinted), *Inservice Inspection Code Case Applicability, ASME Section XI, Division 1*, January 2004.

41. Letter from U.S. Nuclear Regulatory Commission to Nine Mile Point Nuclear Station, LLC, dated September 4, 2002, *Subject: Nine Mile Point Nuclear Station, Unit No. 1 – Risk-Informed Inservice Inspection Program (TAC No. MB4085).*

APPENDIX C – COMMODITY GROUPS (OPTIONAL)

Appendix C is not used in this application.

APPENDIX D – TECHNICAL SPECIFICATION CHANGES

10 CFR 54.22 requires that an application for license renewal include any technical specification changes or additions necessary to manage the effects of aging during the period of extended operation. NMPNS has not identified the need to add new Technical Specifications for license renewal. NMPNS has identified the need to modify existing NMP1 and NMP2 Technical Specifications to address Time Limited Aging Analyses as discussed in Section 4.2.2, Pressure – Temperature (P – T) limits. These changes to the NMP1 and NMP2 Technical Specifications will be submitted, when appropriate, under the normal license amendment process.