VERIFICATION OF VYNPS LICENSE RENEWAL PROJECT REPORT

Title of Report: **Aging Management Review of Nonsafety-related Systems and Components Affecting Safety-related Systems**

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This report documents evaluations related to the VYNPS license renewal project. Signatures certify that the report was prepared, checked and reviewed by the License Renewal Project Team in accordance with the VYNPS license renewal project guidelines and that it was approved by the ENI License Renewal Project Manager and the VYNPS Manager, Engineering Projects.

License Renewal Project Team signatures also certify that a review for determining potential impact to other license renewal documents, based on previous revisions, was conducted for this revision.

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0	Initial Issue	
1	Added clarification of approach used to identify components required to be structurally sound in order to maintain the pressure boundary integrity of safety class piping.	Attachment 4

TABLE OF CONTENTS

1.0 Introduction 6
1.1 Purpose 6
1.2 NRC/Industry Guidance on 10 CFR 54.4(a)(2) Scope 7
1.2.1 Nonsafety-related SSCs required to remain functional 7
1.2.2 Non-safety-related SSCs with the potential for physical interaction 7
2.0 Evaluation Criteria 8
2.1 Mechanical Systems and Components Meeting 54.4(a)(2) for Functional Support of a Safety Function 8
2.2 Mechanical Systems and Components Meeting 54.4(a)(2) for Physical Interaction 8
2.2.1 Mechanical Systems and Components Meeting 54.4(a)(2) with Direct Connection to Safety-Related SSCs 8
2.2.2 Mechanical Systems and Components Meeting 54.4(a)(2) for Spatial Interaction 8
3.0 Individual System Review for Spatial Interaction and Aging Effects 12
3.1 System Reviews 12
3.1.1 MS, ES, & AS Instruments (101) 12
3.1.2 HD & HV Instruments (103) 12
3.1.3 SA & IA Instruments (105) 12
3.1.4 CST & DW Instruments (107) 12
3.1.5 Air Evacuation (AE) 13
3.1.6 Augmented Off Gas (AOG) 13
3.1.7 AOG Cooling Water (AOGCW) 13
3.1.8 Auxiliary Steam (AS) 13
3.1.9 Buildings & Structures (BLD) 14
3.1.10 Condensate (C) 14
3.1.11 Containment Air Dilution (CAD) 14
3.1.12 Condensate Demineralizer (CD) 15
3.1.13 Chemistry Equipment & Supplies (CHEM) 15
3.1.14 Control Rod Drive (CRD) 15
3.1.15 Core Spray (CS) 16
3.1.16 Condensate Storage and Transfer (CST) 16
3.1.17 RWCU Filter Demineralizer (CUFD) 16
3.1.18 Circulating Water (CW) 17
3.1.19 Circulating Water Priming (CWP) 17
3.1.20 Diesel Generator & Auxiliaries (DG) 17
3.1.21 Diesel Lube Oil (DLO) 18
3.1.22 Demineralized Water (DW) 18
3.1.23 Extraction Steam (ES) 18
3.1.24 Feedwater (FDW) 19
3.1.25 Fuel Oil (FO) 19
3.1.26 Fire Protection (FP) 19
3.1.27 Fuel Pool Cooling (FPC) 20

3.1.28 FPC Filter Demineralizer (FPFD)..... 20
3.1.29 Feedwater Controls (FWC) 21
3.1.30 Hydrogen (H2)..... 21
3.1.31 House Heating Boiler (HB) 21
3.1.32 Hydraulic Control Units (HCU)..... 21
3.1.33 Heater Drain (HD) 22
3.1.34 High Pressure Coolant Injection (HPCI) 22
3.1.35 Heater Vents (HV)..... 22
3.1.36 Heating, Ventilation & Air Conditioning (HVAC)..... 23
3.1.37 Hydrogen Water Chemistry (HWC)..... 23
3.1.38 Instrument Air (IA)..... 23
3.1.39 MG Lube Oil (MGLO) 24
3.1.40 Main Steam (MS) 24
3.1.41 Make-up Demineralizer (MUD)..... 24
3.1.42 Nitrogen Supply (N2)..... 25
3.1.43 Nuclear Boiler (NB) 25
3.1.44 Neutron Monitoring (NM)..... 26
3.1.45 Oxygen Injection (OIS)..... 26
3.1.46 Post-Accident Sampling System (PASS)..... 26
3.1.47 Primary Containment Atmospheric Control (PCAC) 27
3.1.48 Potable Water (PW)..... 27
3.1.49 Reactor Building Closed Cooling Water (RBCCW) 27
3.1.50 Reactor Core Isolation Cooling (RCIC)..... 28
3.1.51 Radwaste, Liquid & Solid (RDW)..... 28
3.1.52 Residual Heat Removal (RHR)..... 29
3.1.53 RHR Service Water (RHRSW)..... 29
3.1.54 Equipment Retired in Place (RIP)..... 30
3.1.55 Refuel Platform & Inst (RPI)..... 30
3.1.56 Reactor Water Clean Up (RWCU)..... 30
3.1.57 Service Air (SA)..... 31
3.1.58 Standby Fuel Pool Cooling (SBFPC)..... 31
3.1.59 Standby Gas Treatment (SBGT) 31
3.1.60 Stator Cooling (SC) 32
3.1.61 Security Equipment (SEC) 32
3.1.62 Standby Liquid Control (SLC)..... 32
3.1.63 Seal Oil (SO)..... 33
3.1.64 Sampling System (SPL) 33
3.1.65 Support Equipment (SUPP) 33
3.1.66 Service Water (SW) 33
3.1.67 Turbine Building Closed Cooling Water (TBCCW) 34
3.1.68 Main Turbine Generator (TG)..... 34
3.1.69 Turbine Lube Oil (TLO) 34
3.2 Summary of Aging Effects Requiring Management.....35
3.2.1 Carbon Steel Components (Exposed to Raw Water, Treated Water, Untreated Water, or Steam on Internal Surfaces and Indoor Air, Outdoor Air, or Condensation on External Surfaces) 35
3.2.2 Carbon Steel Components (Exposed to Lube Oil or Fuel Oil on Internal Surfaces and Indoor Air on External Surfaces)..... 35

3.2.3 Stainless Steel Components (Exposed to Raw Water, Treated Water, Untreated Water, or Steam on Internal Surfaces and Indoor Air, Outdoor Air, or Condensation on External Surfaces) 36
3.2.4 Stainless Steel Components (Exposed to Fuel Oil on Internal Surfaces and Indoor Air on External Surfaces) 36
3.2.5 Stainless Steel Components (Exposed to Sodium Pentaborate Solution on Internal Surfaces and Indoor Air on External Surfaces)..... 37
3.2.6 Copper Alloy > 15% Zn Components (Exposed to Raw Water, Treated Water or Untreated Water on Internal Surfaces and Indoor Air, Outdoor Air, or Condensation on External Surfaces) 37
3.2.7 Copper Alloy > 15% Zn Components (Exposed to Fuel Oil or Lube Oil on Internal Surfaces and Indoor Air on External Surfaces)..... 38
3.2.8 Gray Cast Iron Components (Exposed to Raw Water on Internal Surfaces and Indoor Air on External Surfaces) 39
3.2.9 Glass..... 39
3.2.10 Bolting..... 39
4.0 Demonstration That Aging Effects Will Be Managed.....40
4.1 Diesel Fuel Monitoring Program.....41
4.2 Fire Water System Program 41
4.3 Flow-Accelerated Corrosion Program 41
4.4 Instrument Air Quality Program.....41
4.5 Oil Analysis Program 42
4.6 One-Time Inspection Program.....42
4.7 Periodic Surveillance and Preventive Maintenance Program 42
4.8 Selective Leaching Program 42
4.9 Service Water Integrity Program.....43
4.10 System Walkdown Program.....43
4.11 Water Chemistry Control – Auxiliary Systems Program 44
4.12 Water Chemistry Control – BWR Program.....44
4.13 Water Chemistry Control – Closed Cooling Water Program 45
4.14 Time-Limited Aging Analyses.....45
5.0 Summary and Conclusions 46
6.0 References 47
Attachments 52
Attachment 1 System Scoping Results.....52
Attachment 2 Aging Management Review Results 55
Attachment 3 Review Logic Flowchart.....126
Attachment 4 Review of Nonsafety-Related SSCs Connected to Safety-Related SSCs127
Attachment 5 Walkdown Summaries.....130

1.0 Introduction

1.1 Purpose

This report is part of the aging management review (AMR) of the integrated plant assessment (IPA) performed to extend the operating license of Vermont Yankee Nuclear Power Station (VYNPS). This report addresses nonsafety-related systems or components (SCs) whose failure could prevent satisfactory accomplishment of a safety function due to their proximity. The concern is that age-related degradation of nonsafety-related SCs could adversely impact safety-related SCs through physical interaction. This encompasses nonsafety-related SCs directly or not directly connected to safety-related SCs, with seismic II/I, high energy, and moderate/low energy piping system interactions. This report demonstrates that the effects of aging on nonsafety-related passive mechanical components will be adequately managed so that the intended functions of safety-related SCs can be maintained consistent with the current licensing basis as required by 10 CFR 54.21(a)(3). Nonsafety-related structures that could adversely impact safety-related equipment were evaluated in structural aging management review reports and will not be discussed in this report. For additional information on the license renewal project overall scope and documentation, refer to the License Renewal Project Plan **(Ref. 1)**.

The purpose of this engineering report is to demonstrate that aging effects for passive mechanical components in nonsafety-related systems or nonsafety-related portions of safety-related systems (meeting the scoping criteria of 54.4(a)(2)) will be adequately managed for the period of extended operation associated with license renewal. Section 2.0 reviews the 54.4(a)(2) criteria and establishes a logic flowchart (Attachment 3) to be used in the review of systems for spatial interaction. Section 3.0 then documents results of the 54.4(a)(2) flowchart process for each mechanical system at VYNPS. For systems that contain components meeting the 54.4(a)(2) criteria, the aging effects requiring management are identified. Section 4.0 then evaluates if existing programs and commitments adequately manage those effects identified in Section 3.0. The demonstration process is complete for the component under review when either:

- The evaluation of existing programs demonstrates the aging effects requiring management are adequately managed so that the intended function(s) are maintained consistent with the current licensing bases for the period of extended operation, or;
- Action(s) are proposed to augment existing or create new programs to manage the identified effects of aging.

Applicable aging effects were determined using EPRI report 1003056 *Non-Class 1 Mechanical Implementation Guideline and Mechanical Tools* **(Ref. 3)**. This EPRI report provides the bases for identification of aging effects based on specific materials and environments and documents confirmation of the validity of the aging effects through review of industry experience. This aging management review report (AMRR), in conjunction with EPRI report 1003056, documents the identification and evaluation of aging effects requiring management for mechanical components.

1.2 NRC/Industry Guidance on 10 CFR 54.4(a)(2) Scope

On March 15, 2002 the Nuclear Regulatory Commission (NRC) issued a letter to the Nuclear Energy Institute (NEI) providing "Guidance on the Identification and Treatment of Structures, Systems, and Components which Meet 10 CFR 54.4(a)(2)". In this letter the NRC distinguished between two specific situations where nonsafety-related SSCs could affect the functions of safety-related SSCs. In the first situation, nonsafety-related SSCs are directly connected to safety-related SSCs (typically piping). (In this case, the scope of license renewal includes the nonsafety-related piping and supports up to and including the first seismic anchor beyond the safety/nonsafety interface.) In the second situation, nonsafety-related SSCs are not directly connected to safety-related SSCs but have the potential for spatial interaction. Therefore, nonsafety-related SSCs should be included in the scope of license renewal if, based on engineering judgment and operating experience, their failure has the potential to prevent the accomplishment of a safety function performed by safety-related SSCs. For such SSCs that are not directly connected to safety-related SSCs, the impact is the result of the spatial interaction between the SSCs. **(Ref. 4)**

On February 24, 2003, NEI issued a letter to the NRC providing "Industry Guidance on Revised 54.4(a)(2) Scoping Criterion (Nonsafety Affecting Safety)." NRC responded on March 21, 2003, with a letter providing "Staff Comments to 'Industry Guidance on Revised 54.4(a)(2) Scoping Criterion (Nonsafety Affecting Safety)' for License Renewal." NEI has also published an "Industry Guideline for Implementing the Requirements of 10 CFR Part 54 – The License Renewal Rule" which includes this guidance as Appendix F. **(Ref. 2, 23, 24)**

Taken together, these documents define two major areas where SSCs can meet the scoping criteria of 54.4(a)(2): loss of function, and physical interaction (directly-connected and spatial).

1.2.1 Nonsafety-related SSCs required to remain functional

In the case where nonsafety-related SSCs are required to remain functional to support a safety function, those SSCs are within the scope of license renewal per 54.4(a)(2) and subject to aging management review.

1.2.2 Non-safety-related SSCs with the potential for physical interaction

SSCs meeting the scoping criteria of 54.4(a)(2) for physical interaction will fall into the following areas:

1) Nonsafety-related (NSR) SSCs directly connected to safety-related (SR) SSCs
2) NSR SSCs that are directly or not directly connected to SR SSCs but have the potential for spatial interaction.

Section 2.0 of this report will review the specific evaluation criteria used to satisfy this guidance.

2.0 Evaluation Criteria

2.1 Mechanical Systems and Components Meeting 54.4(a)(2) for Functional Support of a Safety Function

A review of VYNPS mechanical systems and components to identify nonsafety-related SCs required to remain functional to provide a safety function is documented in the VYNPS scoping report and in AMRM-26, Main Condenser and MSIV Leakage Pathway **(Ref. 7, 43)**. Attachment 1 provides a system level summary of this review.

2.2 Mechanical Systems and Components Meeting 54.4(a)(2) for Physical Interaction

SSCs meeting the scoping criteria of 54.4(a)(2) for physical interaction are included in the following categories:

1) Nonsafety-related (NSR) SSCs directly connected to safety-related (SR) SSCs
2) NSR SSCs that are directly or not directly connected to SR SSCs but have the potential for spatial interaction.

2.2.1 Mechanical Systems and Components Meeting 54.4(a)(2) with Direct Connection to Safety-Related SSCs

At VYNPS, certain components and piping outside of the safety class pressure boundary must be structurally sound in order to maintain the pressure boundary integrity of safety class piping. Some components included in this group have been designated as safety class at VYNPS. Each mechanical system safety-related to nonsafety-related interface is reviewed to identify the components located between the safety-related/nonsafety-related interface and the first equivalent anchor or structural boundary. Systems which include components that were found to be within the structural boundary or up to and including the first equivalent anchor are listed in Attachment 4 of this report, and the corresponding aging effects are listed in Attachment 2. Attachment 1 provides a system level summary of this review. **(Ref. 47)**

2.2.2 Mechanical Systems and Components Meeting 54.4(a)(2) for Spatial Interaction

The following sections address the different modes of spatial interaction.

2.2.2.1 Physical Impact or Flooding

Nonsafety-related supports for non-seismic (including seismic II/I) piping systems and electrical conduit and cable trays with potential for spatial interaction with safety-related SCs are within the scope of license renewal per 54.4(a)(2) and subject to aging management review. These supports and components are addressed in a commodity fashion within civil/structural AMRRs.

Review of earthquake experience **(Ref. 5)** identified no occurrences of welded steel pipe segments falling due to a strong motion earthquake. Falling of piping segments is extremely rare and only occurs when there is a failure of the supports. This conclusion applies for new and aged pipe. Therefore, as long as the effects of aging on the supports for piping systems are managed, falling of piping sections is not credible except due to flow accelerated corrosion, and the piping section itself is NOT in scope for 54.4(a)(2) due to a physical impact hazard.

Missiles can be generated from internal or external events such as failure of rotating equipment. NSR design features that protect safety-related equipment from missiles are within the scope of license renewal per 54.4(a)(2). These features are addressed in civil/structural AMRRs.

The overhead-handling systems whose failure could result in damage to a system that could prevent the accomplishment of a safety function meet 54.4(a)(2) and are within the scope of license renewal. These features are addressed in civil/structural AMRRs.

Walls, curbs, dikes, doors, etc., that provide flood barriers to safety-related SCs and are within the scope of license renewal per 54.4(a)(2) have been included as part of the building structure and evaluated in the civil/structural AMRRs for that building.

2.2.2.2 Pipe Whip, Jet Impingement, or Harsh Environments

In order to ensure the nonsafety-related portions of high energy lines were included in this 54.4(a)(2) review, the VYNPS SAR and associated site documentation was reviewed. The review of high energy line breaks for VYNPS is contained in the topical design basis document for accident-event combinations **(Ref. 17, 66, 69)**. The systems that were evaluated for postulated pipe breaks are listed, and are described in more detail in Section 7 of the VYNPS Equipment Qualification Program Manual Volume 1 **(Ref. 18)**.

High energy lines are defined as those lines whose service temperature is greater than or equal to 200^{o}F or whose design pressure is greater than or equal to 275 psig **(Ref. 17)**. At VYNPS, such lines are included in the following systems.

A. Inside the reactor building (including the main steam tunnel)
   1. main steam (MS) system
   2. core spray (CS) system
   3. control rod drive (CRD) system
   4. high pressure coolant injection (HPCI) system
   5. reactor core isolation cooling (RCIC) system
   6. reactor water clean-up (RWCU) system
   7. residual heat removal (RHR) system
   8. house heating (HB) system
   9. feedwater (FW) system
   10. sampling (SPL) system
   11. standby liquid control (SLC) system

B. Outside the reactor building
   1. main steam (MS) system
   2. house heating (HB) system
   3. feedwater (FW) system
   4. condensate (C) system
   5. extraction steam (ES) system

Many of these high energy lines are safety-related lines that are reviewed in the system mechanical aging management review reports. During review of the VYNPS systems as documented in Section 3.0 of this report, high energy systems were considered. If a high-energy line break (HELB) analysis assumes that a nonsafety-related piping system does not fail

or assumes failure only at specific locations, then that piping system is within the scope of license renewal per 10 CFR 54.4(a)(2) and subject to aging management review in order to provide reasonable assurance that those assumptions remain valid through the period of extended operation. For additional information on high energy lines, see the topical design basis document for accident-event combinations and Section 7 of the VYNPS Equipment Qualification Program Manual Volume 1 **(Ref. 17, 18)**.

2.2.2.3 Leakage or Spray

This section reviews the 54.4(a)(2) criteria and establishes a logic flowchart (see Attachment 3) for the review of mechanical systems for spatial interaction due to leakage or spray. The review utilizes a "spaces" approach for scoping of non-safety related systems with potential spatial interaction with safety related SSCs. The spaces approach focuses on the interaction between nonsafety-related and safety-related SSCs that are located in the same space. A "space" is defined as a room or cubicle that is separated from other "spaces' by substantial objects (such as wall, floors, and ceilings). The space is defined such that any potential interaction between nonsafety-related and safety-related SSCs is limited to the space. Non-safety related systems and components that contain water, oil, or steam, and are located inside structures that contain safety related SSCs, are included in scope for potential spatial interaction under criterion 10 CFR 54.4(a)(2), unless located in an excluded room. Attachment 1 to this aging management review report provides a listing of VYNPS mechanical systems as identified in the VYNPS scoping report **(Ref. 7)**. In order to identify nonsafety-related systems or nonsafety-related portions of safety-related systems with the potential for adverse spatial interaction with safety-related SCs (54.4(a)(2)), a review of each mechanical system was required.

The first step is to determine if the system only contains air or gas. For these systems, a review of operating experience is performed. The review is to confirm that there have been no failures of air/gas systems that could have adversely impacted the ability of equipment to perform required safety functions. If this can be verified, then air systems are not in scope under 10 CFR 54.4(a)(2) **(Ref. 6)**. A review of industry operating experience associated with nonsafety-related systems/components containing air/gas found six NRC documents and two INPO documents:

- NRC Generic Letter 88-14
- NRC Information Notices 81-38, 87-28, 89-26, 99-01, and 02-29
- INPO Significant Operating Experience Report 88-01
- INPO Significant Event Report 1-99

None of these documents described instances where nonsafety-related air/gas system leakage or ruptures adversely impacted safety-related equipment **(Ref. 8, 9, 10, 11, 12, 13, 14, 15)**.

The operating experience review performed for VYNPS in report LRPD-05 confirmed that there have been no failures of air/gas systems that could have adversely impacted the ability of equipment to perform required safety functions **(Ref. 16)**. Based on this review, air or gas systems are not in scope under 10 CFR 54.4(a)(2).

The second step is performed using a "spaces" approach to determine if the system has components in a safety-related structure. Systems that only contain components in office buildings, warehouses, yard area, etc, cannot interact with safety-related components and the

nonsafety-related system does not meet 54.4(a)(2). The following are seismic class 1 structures at VYNPS that contain safety-related plant equipment:

- condensate storage tank (CST) valve and instrument enclosure
- control room building
- cooling tower #2 cell 1
- fuel oil transfer pump house
- plant stack
- primary containment
- reactor building
- intake structure (service water pump area only)
- certain areas of the turbine building (diesel generator rooms, fuel oil day tank areas, ECCS keep-full station, and the area on elevation 252 where service water piping runs along the wall [key codes 6 – 8 and E – F]).

For further information on structures, see the VYNPS scoping report **(Ref. 7)**.

Systems that contain liquid-filled nonsafety-related components in safety-related structures require as a third step: a component level evaluation to determine the potential for spatial interaction with a safety-related SSC from leakage or spray. For structures that contain safety related SSCs, there may be selected rooms (spaces) that do not contain any safety related SSCs. Components located in these rooms are not in scope for 54.4(a)(2). In light of §54.4(a)(2), the concern for these systems is the impact of a pressure boundary failure on safety-related systems. These failures could result in the nonsafety-related piping spraying or leaking on safety-related equipment. Consideration of hypothetical failures that could result from system interdependencies that are not part of the CLB and that have not been previously experienced is not required. **(Ref. 6)** Nonsafety-related components such as the VYNPS normal fuel pool cooling heat exchangers are an example of components that are in a safety-related building and could spatially interact with safety-related components.

See Attachment 3 for a graphic representation of the scoping review that is performed. For components that meet all three criteria, an aging management review is performed on the passive long-lived mechanical components. The passive mechanical components reviewed include piping, tubing, valve bodies, flow elements, heat exchangers, orifices, pump casings, rupture discs, sight glasses, strainer housings, tanks, filter housings and other passive components.

Insulation is installed on some equipment in VYNPS systems. For the evaluation of insulation, refer to LRPD-01, System and Structure Scoping Results, and AMRC-06, Aging Management Review of Bulk Commodities. **(Ref. 7, 22)**

Section 3.0 of this report documents the component level evaluation.

3.0 Individual System Review for Spatial Interaction and Aging Effects

This section documents the review against the spatial interaction criteria for each mechanical system identified in the VYNPS scoping report **(Ref. 7)**. The electrical and structural systems identified in the VYNPS scoping report include no mechanical components and therefore are not part of this review.

3.1 System Reviews

The flowchart of Attachment 3 is followed, and the basis for a system's review or exclusion is presented for each system. Attachment 1 provides a summary of this review at a system level.

3.1.1 MS, ES, & AS Instruments (101)

The purpose of the 101 system is to provide indication, alarm, and control functions for associated systems (main steam, extraction steam, and auxiliary steam). The passive mechanical components for this system are in the turbine building. **(Ref. 7, 20, 21, 68)**

Some components in this system are located in the main condenser and MSIV leakage pathway. Failure of these components could prevent satisfactory accomplishment of a safety function and the system is therefore within the scope of license renewal per 54.4(a)(2). These components are reviewed in AMRM-26, Main Condenser and MSIV Leakage Pathway. The remaining passive mechanical components in this system cannot affect safety-related components and are not subject to aging management review. **(Ref. 7, 20, 21, 43)**

3.1.2 HD & HV Instruments (103)

The purpose of the 103 system is to provide indication, alarm, and control functions for associated systems (heater drains and heater vents). This system does not require aging management review since its passive mechanical components are in the turbine building in areas that cannot affect safety-related components. **(Ref. 7, 20, 21, 68)**

3.1.3 SA & IA Instruments (105)

The purpose of the 105 system is to provide indication, alarm, and control functions for associated air systems. This system does not require aging management review since its passive mechanical components in buildings that contain safety-related equipment only contain dry air or gas. **(Ref. 7, 20, 21, 68)**

3.1.4 CST & DW Instruments (107)

The purpose of the 107 system is to provide indication, alarm, and control functions for associated systems (condensate storage and transfer and demineralized water). This system does not require aging management review since its passive mechanical components are in the turbine building and the yard area in areas that cannot affect safety-related components. **(Ref. 7, 20, 21, 68)**

3.1.5 Air Evacuation (AE)

The purpose of the AE system is to evacuate gases from the main turbine and main condenser during startup and maintain the system free of noncondensible gases during operation. This system does not require aging management review since its passive mechanical components are in the turbine building in areas that cannot affect safety-related components. **(Ref. 7, 20, 21, 68)**

3.1.6 Augmented Off Gas (AOG)

The purpose of the AOG system is to collect, process, and discharge radioactive gaseous wastes to the atmosphere through the plant stack during normal operation. The passive mechanical components for this system are in the AOG building, the plant stack, the radwaste building, and the turbine building. **(Ref. 7, 20, 21, 68)**

Some components in this system are located in the main condenser and MSIV leakage pathway. Failure of these components could prevent satisfactory accomplishment of a safety function and the system is therefore within the scope of license renewal per 54.4(a)(2). These components are reviewed in AMRM-26, Main Condenser and MSIV Leakage Pathway. **(Ref. 7, 20, 21, 43)**

The portion of the system associated with the plant stack loop seal requiring aging management review due to potential spatial interaction includes carbon steel piping, copper alloy tubing, valve bodies, filter housings, and tanks exposed to treated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

The remaining passive mechanical components in this system are in areas that cannot affect safety-related components and are not subject to aging management review. **(Ref. 20, 21, 68)**

3.1.7 AOG Cooling Water (AOGCW)

The purpose of the AOGCW system is to provide inhibited glycol-water cooling to auxiliary equipment in the AOG building. This system does not require aging management review since its passive mechanical components are in the AOG building and cannot affect safety-related components. **(Ref. 7, 20, 21, 68)**

3.1.8 Auxiliary Steam (AS)

The purpose of the AS system is to provide steam from main steam piping to the steam jet air ejector for maintaining main condenser vacuum. The passive mechanical components for this system are in the turbine building. **(Ref. 7, 20, 21, 68)**

Some components in this system are located in the main condenser and MSIV leakage pathway. Failure of these components could prevent satisfactory accomplishment of a safety function and the system is therefore within the scope of license renewal per 54.4(a)(2). These components are reviewed in AMRM-26, Main Condenser and MSIV Leakage Pathway. The remaining passive mechanical components in this system are in areas that cannot affect safety-related components and are not subject to aging management review. **(Ref. 7, 20, 21, 43)**

3.1.9 Buildings & Structures (BLD)

The BLD system includes floor drains and the site sewers. This system classification also designates buildings and structures which are evaluated in civil/structural AMRRs.

This system does not require aging management review since its passive mechanical components are in the AOG building, turbine building, the yard, and outside of controlled access (OCA) and cannot affect safety-related components. **(Ref. 7, 20, 21, 68)**

3.1.10 Condensate (C)

The purpose of the condensate system is to receive condensed steam from the condenser and supply it to the reactor feedwater system as well as various other components and systems, such as the air ejector condensers, steam packing exhausters, and CRD pumps. The passive mechanical components for this system are in the AOG building and the turbine building. **(Ref. 7, 20, 21, 68)**

Some components in this nonsafety-related system are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the safety class boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

Some components in this system are located in the main condenser and MSIV leakage pathway. Failure of these components could prevent satisfactory accomplishment of a safety function and the system is therefore within the scope of license renewal per 54.4(a)(2). These components are reviewed in AMRM-26, Main Condenser and MSIV Leakage Pathway. **(Ref. 7, 20, 21, 43)**

The portion of the system at the ECCS keep-full station in the turbine building as well as the area on elevation 252 where service water piping runs along the wall requiring aging management review due to potential spatial interaction includes carbon steel piping and valve bodies and copper alloy tubing exposed to treated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.11 Containment Air Dilution (CAD)

The purpose of the CAD system is to limit the concentration of oxygen in the primary containment such that ignition of the hydrogen and oxygen produced by a metal-water reaction following a loss of coolant accident will not occur. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-08, Primary Containment Atmosphere Control and Containment Atmosphere Dilution Systems. **(Ref. 7, 20, 21, 32, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its

safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The remaining passive mechanical components in this system contain only dry air and gas and thus do not require an aging management review. **(Ref. 7, 20, 21)**

3.1.12 Condensate Demineralizer (CD)

The purpose of the CD system is to maintain the required purity of feedwater supplied to the reactor. Some components in this nonsafety-related system are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the safety class boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 7, 20, 21, 68)**

The remaining passive mechanical components in this system are in the turbine building in areas that cannot affect safety-related components, and thus do not require an aging management review. **(Ref. 7, 20, 21)**

3.1.13 Chemistry Equipment & Supplies (CHEM)

This system consists of an air monitor located about two miles from the site used for environmental monitoring. This system does not require aging management review since there are no passive mechanical components. **(Ref. 7, 20, 21, 68)**

3.1.14 Control Rod Drive (CRD)

The purpose of the CRD system is to provide a means to control core reactivity by positioning neutron absorbing control rods within the reactor core. The CRD system is also required to quickly shut down the reactor (scram) by rapidly inserting control rods into the core in response to a manual or automatic signal. The passive mechanical components in this system are in the reactor building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-16, Instrument Air, AMRM-20, Primary Containment Penetrations, and AMRM-33, Reactor Coolant System Pressure Boundary. **(Ref. 7, 20, 21, 38, 42, 45, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the reactor building that requires aging management review due to potential spatial interaction includes stainless steel tubing, copper alloy tubing, stainless steel and carbon steel piping, valve bodies, filter housings, orifices, pump casings, strainer housings, and tanks, exposed to treated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.15 Core Spray (CS)

The purpose of the CS system is to provide core cooling for all design basis pipe breaks. The passive mechanical components in this system are in the reactor building and the primary containment. Components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-03, Core Spray System, and AMRM-33, Reactor Coolant System Pressure Boundary. **(Ref. 7, 20, 21, 27, 45, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the reactor building that requires aging management review due to potential spatial interaction includes stainless steel tubing, stainless steel and carbon steel piping and valve bodies exposed to treated water and indoor air, as well as copper alloy valves and tubing and carbon steel bearing housings and piping exposed to lube oil and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.16 Condensate Storage and Transfer (CST)

The purpose of the CST system is to provide a source of water to various plant systems (HPCI, RCIC, CS, CRD, and the spent fuel pool). The passive mechanical components in this system are in the CST valve and instrument enclosure, the primary containment, the reactor building, the radwaste building, and the turbine building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-06, Reactor Core Isolation Cooling System. **(Ref. 7, 20, 21, 30, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the CST valve and instrument enclosure, the primary containment, and the reactor building that requires aging management review due to potential spatial interaction includes copper alloy tubing, and carbon steel piping and valve bodies exposed to treated water and indoor and outdoor air. Carbon steel and stainless steel bolting is exposed to indoor air and outdoor air. **(Ref. 20, 21)**

3.1.17 RWCU Filter Demineralizer (CUFD)

The purpose of the CUFD system is to provide for filtration and clean-up of reactor water and to provide an alternate means of boron injection to the vessel in conjunction with RWCU. The passive mechanical components in this system are in the reactor building, the radwaste building, and the turbine building. **(Ref. 7, 20, 21, 68)**

The portion of the system in the reactor building that requires aging management review due to potential spatial interaction includes stainless steel tubing and pump casing, copper alloy tubing, stainless steel and carbon steel piping and valve bodies, filter housings, orifices, strainer housings, and tanks exposed to treated water and indoor air, as well as sight glasses with stainless steel or carbon steel housing and glass sight areas exposed to treated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.18 Circulating Water (CW)

The purpose of the CW system is to provide the main condensers with a dynamic heat sink for steam condensation. Heat removal in the condensers is accomplished by providing a continuous supply of cooling water pumped from and returned to the Connecticut River or by recirculation flow pumped through cooling towers. The passive mechanical components in this system are in the cooling towers, the discharge structure, the intake structure, and the turbine building. **(Ref. 7, 20, 21, 68)**

The portion of the system in cooling tower #2 cell 1 that requires aging management review due to potential spatial interaction includes copper alloy tubing, carbon steel piping and valve bodies and pump casings exposed to raw water and condensation. Carbon steel and stainless steel bolting is exposed to outdoor air. **(Ref. 20, 21)**

3.1.19 Circulating Water Priming (CWP)

The purpose of the CWP system is to provide for evacuation of the discharge side of the main condenser. This system does not require aging management review since its passive mechanical components are in the turbine building in areas that cannot affect safety-related components. **(Ref. 7, 20, 21, 68)**

3.1.20 Diesel Generator & Auxiliaries (DG)

The purpose of the DG system is to provide Class 1E electrical power to the emergency buses in a loss of normal power (LNP) condition or a loss of coolant accident (LOCA) coincident with LNP/degraded grid voltage at the emergency buses and to be available to provide Class 1E electrical power to the emergency buses in a LOCA with normal power available. The passive mechanical components in this system are in the turbine building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-13, Emergency Diesel Generator System, and AMRM-15, Fuel Oil System. **(Ref. 7, 20, 21, 35, 37, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system at the diesel generator rooms in the turbine building that requires aging management review due to potential spatial interaction includes copper alloy tubing, and carbon steel piping and valve bodies and tanks exposed to treated water, fuel oil, and indoor

air, as well as the cooling and lubrication subcomponents for the C-3-1A and C-3-1B starting air compressors which include carbon steel exposed to treated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21, 47, 49)**

3.1.21 Diesel Lube Oil (DLO)

The purpose of the DLO system is to provide for storage of diesel lube oil and provide for pre-lube of the diesel generators to support testing. The passive mechanical components in this system are in the turbine building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in are reviewed in AMRM-13, Emergency Diesel Generator System. **(Ref. 7, 20, 21, 35, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

All of the components in this system are reviewed in AMRM-13, Emergency Diesel Generator System, thus there are no other components in this system requiring aging management review. **(Ref. 20, 21, 35)**

3.1.22 Demineralized Water (DW)

The purpose of the DW system is to provide treated makeup water for the various plant components, such as the condensate storage tank and spent fuel pool. The passive mechanical components in this system are in the AOG building, the control room building, the radwaste building, the reactor building, the service building addition, the turbine building, and the yard. **(Ref. 7, 20, 21, 68)**

Some components in this nonsafety-related system are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the safety class boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the control room building, the CST valve and instrument enclosure, the reactor building, and at the diesel generator rooms in the turbine building that requires aging management review due to potential spatial interaction includes stainless steel, carbon steel, and copper alloy piping and tubing and valve bodies exposed to treated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21, 49)**

3.1.23 Extraction Steam (ES)

The purpose of the ES system is to supply steam to the shell side of various feedwater heaters for condensate and feedwater heating. This system does not require aging management

review since its passive mechanical components are in the turbine building in areas that cannot affect safety-related components. **(Ref. 7, 20, 21, 68)**

3.1.24 Feedwater (FDW)

The purpose of the FDW system is to provide demineralized water from the condensate system to the reactor vessel at a rate sufficient to maintain adequate reactor vessel water level. The passive mechanical components in this system are in the reactor building, the primary containment, and the turbine building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-06, Reactor Core Isolation Cooling System, and AMRM-33, Reactor Coolant System Pressure Boundary. **(Ref. 7, 20, 21, 30, 45, 68)**

The portion of the system in the reactor building and in the primary containment that requires aging management review due to potential spatial interaction includes copper alloy tubing, carbon steel piping and valve bodies exposed to treated water > 220°F and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.25 Fuel Oil (FO)

The purpose of the FO system is to supply fuel oil to the emergency diesel generators (EDGs) as well as the nonsafety-related diesel-driven fire pump and house heating boiler. The passive mechanical components in this system are in the fuel oil transfer pump house, the intake structure, the John Deere diesel building, the turbine building, and the yard. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-15, Fuel Oil System. **(Ref. 7, 20, 21, 37, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the fuel oil transfer pump house that requires aging management review due to potential spatial interaction includes copper alloy tubing, stainless steel tubing, stainless steel and carbon steel piping and valve bodies and pump casings exposed to fuel oil and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.26 Fire Protection (FP)

The purpose of the FP system is to provide fire protection for the station through the use of water, carbon dioxide, dry chemicals, foam, detection and alarm systems, and rated fire barriers, doors, and dampers. The passive mechanical components in this system are in the construction office building, the control room building, the cooling towers, the intake structure, the reactor building, the service building addition, the turbine building, and various warehouses and yard structures. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-15, Fuel Oil System, AMRM-17, Fire Protection – Water

System, AMRM-18, Fire Protection – CO2 System, and AMRM-19, Heating, Ventilation, and Air Conditioning Systems. **(Ref. 7, 20, 21, 37, 39, 40, 41, 68)**

Some components in this nonsafety-related system are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the safety-related pressure boundary of the SW system depends on the structural boundary piping and supports of the FP system in order for the SW system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in cooling tower #2 cell 1, the reactor building, and the service water pump area of the intake structure that requires aging management review due to potential spatial interaction includes copper alloy tubing, gray cast iron and carbon steel piping and valve bodies exposed to raw water, indoor air, and outdoor air. Carbon steel and stainless steel bolting is exposed to indoor air and outdoor air. **(Ref. 20, 21)**

3.1.27 Fuel Pool Cooling (FPC)

The purpose of the FPC system is to remove the decay heat released from the spent fuel elements. The passive mechanical components in this system are in the primary containment and the reactor building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-14, Fuel Pool Cooling Systems. **(Ref. 7, 20, 21, 36, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the primary containment and reactor building that requires aging management review due to potential spatial interaction includes copper alloy tubing, stainless steel tubing, stainless steel and carbon steel piping and valve bodies, heat exchangers, filter housings, and pump casings exposed to treated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21, 49, 67)**

3.1.28 FPC Filter Demineralizer (FPFD)

The purpose of the FPFD is to maintain the purity of the spent fuel pool water. The passive mechanical components in this system are in the radwaste building and the reactor building. **(Ref. 7, 20, 21, 68)**

The portion of the system in the reactor building that requires aging management review due to potential spatial interaction includes copper alloy tubing, carbon steel piping and valve bodies exposed to treated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.29 Feedwater Controls (FWC)

The purpose of the FWC system is to provide the necessary instrumentation and controls to maintain a pre-established water level in the reactor vessel during normal operations. This system does not require aging management review since its passive mechanical components only contain dry air or gas. **(Ref. 7, 20, 21, 68)**

3.1.30 Hydrogen (H2)

The purpose of the H2 system is to provide hydrogen storage, distribution, and pressure control, mainly for the turbine-generator (TG) system. This system does not require aging management review since its passive mechanical components are in the hydrogen storage shed, various warehouses and storage areas and areas of the turbine building that cannot affect safety-related components. **(Ref. 7, 20, 21, 68)**

3.1.31 House Heating Boiler (HB)

The purpose of the HB system is to provide a source of steam for space heating and process requirements during all phases of station operation. The passive mechanical components in this system are in the AOG building, the CST valve and instrument enclosure, the control room building, the radwaste building, the reactor building, the service building addition, the turbine building, and various warehouses and yard areas. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-19, Heating, Ventilation, and Air Conditioning Systems. **(Ref. 7, 20, 21, 41, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the CST valve and instrument enclosure, the control room building, the reactor building, and at the diesel generator rooms in the turbine building that requires aging management review due to potential spatial interaction includes carbon steel piping and valves, steam traps, and tanks exposed to steam > 220°F, treated water, condensation, and indoor air, as well as copper alloy tubing and pump casings exposed to treated water, condensation, and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.32 Hydraulic Control Units (HCU)

The purpose of the HCU system is to provide for delivery of a pressurized water volume upon receipt of a valid initiation signal to fully insert control rods during a scram. The passive mechanical components in this system are in the reactor building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-16, Instrument Air, and AMRM-33, Reactor Coolant System Pressure Boundary. **(Ref. 7, 20, 21, 38, 45, 68)**

The portion of the system in the reactor building that requires aging management review due to potential spatial interaction include copper alloy tubing, stainless steel piping and tubing, valves and filter housings exposed to treated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.33 Heater Drain (HD)

The purpose of the HD system is to provide proper level and control for the moisture separator and feedwater heaters by providing drain capability to the main condenser. This system does not require aging management review since its passive mechanical components are in the turbine building in areas that cannot affect safety-related components. **(Ref. 7, 20, 21, 68)**

3.1.34 High Pressure Coolant Injection (HPCI)

The purpose of the HPCI system is to assure that the reactor core is adequately cooled in the event of a small break in the nuclear system and subsequent loss of coolant which does not result in rapid depressurization of the reactor vessel. The passive mechanical components in this system are in the CST valve and instrument enclosure, the primary containment, the radwaste building, the reactor building, and the turbine building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-05, High Pressure Coolant Injection System, and AMRM-33, Reactor Coolant System Pressure Boundary. **(Ref. 7, 20, 21, 29, 45, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The rupture disc (S-23-7) is replaced every 234 weeks. Since replacement is based on a specified time period, this component is not subject to aging management review. **(Ref. 64)**

The portion of the system in the primary containment and reactor building that requires aging management review due to potential spatial interaction includes carbon steel piping and valves exposed to steam > 270^{o}F, treated water, and indoor air, as well as copper alloy tubing exposed to treated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.35 Heater Vents (HV)

The purpose of the HV system is to provide for venting of non-condensable gases back to the main condenser. This system does not require aging management review since its passive mechanical components are in the turbine building in areas that cannot affect safety-related components. **(Ref. 7, 20, 21, 68)**

3.1.36 Heating, Ventilation & Air Conditioning (HVAC)

The purpose of HVAC systems is to maintain the general area environment for personnel and equipment. The passive mechanical components in this system are in the AOG building, the control room building, the intake structure, the John Deere diesel building, the primary containment, the radwaste building, the reactor building, various nonsafety-related houses and support buildings, the turbine building, and various warehouses and yard areas. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-11, Service Water Systems, AMRM-12, Reactor Building Closed Cooling Water Systems, and AMRM-19, Heating, Ventilation, and Air Conditioning Systems. **(Ref. 7, 20, 21, 33, 34, 41, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the reactor building that requires aging management review due to potential spatial interaction includes copper alloy tubing, carbon steel piping and carbon steel valve bodies exposed to raw water and indoor air, as well as the carbon steel surface of the reactor building chillers exposed to raw water and condensation. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.37 Hydrogen Water Chemistry (HWC)

The purpose of the HWC system is to mitigate the chemical conditions in the reactor that allow IGSCC in the recirculation piping and reactor vessel internals. The HWC system injects hydrogen into the reactor feedwater at the suction of the feedwater pumps. This system does not require aging management review since its passive mechanical components are in the turbine building in areas that cannot affect safety-related components. **(Ref. 7, 20, 21, 68)**

3.1.38 Instrument Air (IA)

The instrument air system provides the station with a continuous supply of dry, oil-free air for pneumatic instruments and controls through a dual header system. The passive mechanical components in this system containing other than dry air or gas are in the reactor building and the turbine building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-16, Instrument Air. **(Ref. 7, 20, 21, 38, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the reactor building that requires aging management review due to potential spatial interaction are the cooling and lubrication subcomponents for the containment air compressor (C-2-1A) and its precooler and aftercooler which includes carbon steel piping exposed to lube oil, treated water, and indoor air, as well as the carbon steel air dryer towers (tanks), drain piping, valves, and traps associated with the containment air dryer (D-2-1A) exposed to untreated water and indoor air, as well as the carbon steel drain piping, valves, and traps associated with the air receiver tank and knock-out drum (TK-55-1A and TK-154-1A) exposed to untreated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.39 MG Lube Oil (MGLO)

The purpose of the MGLO system is to provide lubrication to the reactor recirculation pump motor generator set during its operation. The passive mechanical components in this system are in the reactor building. **(Ref. 7, 20, 21, 68)**

Some components in this non-safety-related system are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the safety class boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the reactor building that requires aging management review due to potential spatial interaction includes copper alloy tubing, carbon steel piping and valve bodies, heat exchangers, and pump casings exposed to raw water, lube oil and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.40 Main Steam (MS)

The purpose of the MS system is to conduct steam from the Class I steam piping to the main turbine at a controlled pressure during normal operation. The passive mechanical components in this system are in the reactor building and the turbine building. **(Ref. 7, 20, 21, 68)**

Some components in this system are located in the main condenser and MSIV leakage pathway. Failure of these components could prevent satisfactory accomplishment of a safety function and the system is therefore within the scope of license renewal per 54.4(a)(2). These components are reviewed in AMRM-26, Main Condenser and MSIV Leakage Pathway. The remaining passive mechanical components in this system cannot affect safety-related components and are not subject to aging management review. **(Ref. 7, 20, 21, 43)**

3.1.41 Make-up Demineralizer (MUD)

The purpose of the MUD system is to provide a supply of treated water to the DW system that may be used as makeup for the station and reactor cycles. This system does not require aging management review since its passive mechanical components are in the turbine building in areas that cannot affect safety-related components. **(Ref. 7, 20, 21, 68)**

3.1.42 Nitrogen Supply (N2)

The purpose of the N2 system is to provide nitrogen gas to the primary containment atmospheric control (PCAC) system to satisfy the primary containment purge and normal make-up requirements. Some components in this nonsafety-related system are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the safety class boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 7, 20, 21, 68)**

The remaining passive mechanical components in this system in buildings that contain safety-related equipment contain only dry air or gas, thus they do not require an aging management review. **(Ref. 7, 20, 21)**

3.1.43 Nuclear Boiler (NB)

The purpose of the NB system (also known as the nuclear system or reactor coolant system) is to contain and transport the fluids coming from or going to the reactor core. The passive mechanical components in this system are in the primary containment and reactor building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-04, Automatic Depressurization System, AMRM-05, High Pressure Coolant Injection System, AMRM-06, Reactor Core Isolation Cooling System, AMRM-12, Reactor Building Closed Cooling Water System, AMRM-16, Instrument Air System, AMRM-20, Primary Containment Penetrations, AMRM-31, Reactor Pressure Vessel, AMRM-32, Reactor Vessel Internals, and AMRM-33, Reactor Coolant System Pressure Boundary. **(Ref. 7, 20, 21, 28, 29, 30, 34, 38, 42, 44, 45, 65, 68)**

Some components in this system are located in the main condenser and MSIV leakage pathway. Failure of these components could prevent satisfactory accomplishment of a safety function and the system is therefore within the scope of license renewal per 54.4(a)(2). These components are reviewed in AMRM-26, Main Condenser and MSIV Leakage Pathway. **(Ref. 7, 20, 21, 43)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the primary containment and the reactor building that requires aging management review due to potential spatial interaction includes stainless steel tubing, stainless steel and carbon steel piping (including SRV discharge lines), flow elements, valve bodies, and filter housings exposed to steam > 270^{o}F, treated water, and indoor air, as well as stainless steel orifices and copper alloy tubing exposed to treated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.44 Neutron Monitoring (NM)

The purpose of the NM system is to provide indication of neutron flux, which can be correlated to thermal power level, for the entire range of flux conditions that may exist in the core. The passive mechanical components in this system are in the primary containment and the reactor building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-20, Primary Containment Penetrations. **(Ref. 7, 20, 21, 42, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The remaining passive mechanical components in this system in buildings that contain safety-related equipment contain only dry air or gas, thus they do not require an aging management review. **(Ref. 7, 20, 21)**

3.1.45 Oxygen Injection (OIS)

The purpose of the OIS is to provide for injection of filtered oxygen to the condensate/feedwater for chemistry control. This system does not require aging management review since its passive mechanical components only contain dry air or gas. **(Ref. 7, 20, 21, 68)**

3.1.46 Post-Accident Sampling System (PASS)

The purpose of PASS is to provide representative samples of reactor coolant for analysis. The passive mechanical components in this system are in the reactor building and the turbine building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-05, High Pressure Coolant Injection System, and AMRM-08, Primary Containment Atmosphere Control and Containment Atmosphere Dilution Systems. **(Ref. 7, 20, 21, 29, 32, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the reactor building that requires aging management review due to potential spatial interaction includes stainless steel tubing and valve bodies exposed to treated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.47 Primary Containment Atmospheric Control (PCAC)

The purpose of the PCAC system is to ensure that the containment atmosphere remains inerted with nitrogen during station power operation. The passive mechanical components in this system are in the nitrogen storage shed, the primary containment, and the reactor building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-08, Primary Containment Atmosphere Control and Containment Atmosphere Dilution Systems. **(Ref. 7, 20, 21, 32, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The remaining passive mechanical components in this system in buildings that contain safety-related equipment contain only dry air or gas, thus they do not require an aging management review. **(Ref. 7, 20, 21)**

3.1.48 Potable Water (PW)

The purpose of the PW system is to provide a sufficient supply of treated water suitable for drinking and for sanitary purposes. The passive mechanical components in this system are in various houses, support buildings, warehouses and yard areas, and areas of the turbine building. **(Ref. 7, 20, 21, 68)**

The portion of the system in the “A” diesel generator room in the turbine building that requires aging management review due to potential spatial interaction includes carbon steel piping exposed to untreated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21, 68)**

3.1.49 Reactor Building Closed Cooling Water (RBCCW)

The purpose of the RBCCW system is to supply demineralized water to the reactor building auxiliary equipment systems from a closed cooling loop. The passive mechanical components in this system are in the primary containment, radwaste building, and the reactor building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-11, Service Water Systems, and AMRM-12, Reactor Building Closed Cooling Water System. **(Ref. 7, 20, 21, 33, 34, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the primary containment and reactor building that requires aging management review due to potential spatial interaction includes copper alloy tubing, carbon steel piping and valve bodies, heat exchanger shells, pump casings, strainer housings, tanks, and a sight glass exposed to treated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21, 49)**

3.1.50 Reactor Core Isolation Cooling (RCIC)

The purpose of the RCIC system is to provide makeup water to the reactor vessel during shutdown and isolation from feedwater to supplement or replace the normal makeup sources. The passive mechanical components in this system are in the CST valve and instrument enclosure, the primary containment, the reactor building, and the turbine building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-06, Reactor Core Isolation Cooling System, and AMRM-33, Reactor Coolant System Pressure Boundary. **(Ref. 7, 20, 21, 30, 45, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the reactor building that requires aging management review due to potential spatial interaction includes carbon steel piping and valve bodies and a rupture disc exposed to steam > 270^{o}F, treated water, and indoor air, as well as copper alloy tubing exposed to treated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.51 Radwaste, Liquid & Solid (RDW)

The RDW system includes both the liquid radwaste system and the solid radwaste system. The purpose of the liquid radwaste system is to collect and process potentially radioactive liquid wastes. The solid radwaste system collects and processes radioactive solid wastes for possible temporary on-site storage and off-site shipment for permanent disposal. The passive mechanical components in this system are in the CST valve and instrument enclosure, the discharge structure, the intake structure, the plant stack, the primary containment, the radwaste building, the reactor building, the service building addition, the turbine building, and the yard. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-02, Residual Heat Removal System, and AMRM-20, Primary Containment Penetrations. **(Ref. 7, 20, 21, 26, 42, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the CST valve and instrument enclosure, service water pump area of the intake structure, plant stack, primary containment, and reactor building that requires aging management review due to potential spatial interaction includes copper alloy tubing, carbon steel piping and valve bodies, pump casings, strainer housings, and tanks exposed to treated water, untreated water, and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.52 Residual Heat Removal (RHR)

The purpose of the RHR system is to remove decay heat energy from the reactor under both operational and accident conditions. The passive mechanical components in this system are in the primary containment, the reactor building, and the radwaste building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-02, Residual Heat Removal System, AMRM-11, Service Water Systems, and AMRM-33, Reactor Coolant System Pressure Boundary. **(Ref. 7, 20, 21, 26, 33, 45, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the primary containment and reactor building that requires aging management review due to potential spatial interaction includes copper alloy tubing, carbon steel piping and valve bodies exposed to treated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.53 RHR Service Water (RHRSW)

The purpose of the RHRSW system is to provide a dynamic heat sink for the RHR system during normal operation and under accident conditions. The passive mechanical components in this system are in the reactor building, and the turbine building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-11, Service Water Systems. **(Ref. 7, 20, 21, 33, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the reactor building that requires aging management review due to potential spatial interaction includes copper alloy tubing, stainless steel tubing, stainless steel and carbon steel piping and valve bodies exposed to raw water and condensation. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.54 Equipment Retired in Place (RIP)

This system designation in the component database is used for obsolete equipment. The passive mechanical components in this system are in the cooling towers, the primary containment, the radwaste building, the reactor building, and the turbine building. **(Ref. 7, 20, 21, 68)**

Some components in this nonsafety-related system are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the safety class boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The components in this system are classified as “retired in place.” Piping to these components has been capped, cut, or removed, or valves are closed to isolate the components. No significant corrosion is expected to occur where residual fluids may be present due to the elimination of oxygen that would allow corrosion to occur. None of this equipment provides a source of spray since it is no longer pressurized. Therefore they are not subject to aging management review for spatial interaction. **(Ref. 20, 21)**

3.1.55 Refuel Platform & Inst (RPI)

The purpose of the RPI system is to provide the means for efficient and safe servicing of reactor systems. The passive mechanical components in this system are in the reactor building, yet are located such that they cannot affect safety-related components. Thus they are not subject to aging management review. **(Ref. 7, 20, 21, 68)**

3.1.56 Reactor Water Clean Up (RWCU)

The purpose of the RWCU system is to maintain high reactor water purity to limit chemical and corrosive action and to remove corrosion products to limit impurities available for neutron flux activation. The passive mechanical components in this system are in the primary containment, the reactor building, and the radwaste building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-06, Reactor Core Isolation Cooling System, and AMRM-33, Reactor Coolant System Pressure Boundary. **(Ref. 7, 20, 21, 30, 45, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the primary containment and reactor building that requires aging management review due to potential spatial interaction includes copper alloy tubing, stainless steel tubing, stainless steel and carbon steel piping and valve bodies, filter housings, heat exchangers, orifice, pump casings, strainer housings, and tanks exposed to treated water >

270°F and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21, 50)**

3.1.57 Service Air (SA)

The purpose of the SA system is to provide the station with the compressed air requirements for pneumatic instruments and controls and general station services. The passive mechanical components in this system are in the intake structure, the radwaste building, the reactor building, and the turbine building. **(Ref. 7, 20, 21, 68)**

This system does not require aging management review since its passive mechanical components in buildings that contain safety-related equipment only contain untreated air. Components containing only air cannot adversely affect safety-related SSCs due to leakage or spray. **(Ref. 2, 20, 21)**

3.1.58 Standby Fuel Pool Cooling (SBFPC)

The purpose of the SBFPC system is to maintain pool temperature during a design basis accident (which includes a condition of concurrent loss-of-coolant accident, loss of off-site power, and single failure) or should an unusually high spent fuel decay heat load be placed in the pool. The passive mechanical components in this system are in the reactor building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-11, Service Water Systems, and AMRM-14, Fuel Pool Cooling Systems. **(Ref. 7, 20, 21, 33, 36, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The remaining passive mechanical components in this system are nonfluid-filled drain lines and valves which cannot affect safety-related components and are not subject to aging management review. **(Ref. 7, 20, 21)**

3.1.59 Standby Gas Treatment (SBGT)

The purpose of the SBGT system is to process gaseous effluent from the primary and secondary containment when required to limit the discharge of radioactive materials to the environs and limit exfiltration from the secondary containment during periods of primary containment isolation. The passive mechanical components in this system are in the reactor building, underground in the plant yard area, and at the plant stack. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-07, Standby Gas Treatment System. **(Ref. 7, 20, 21, 31, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary

depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The remaining passive mechanical components in this system contain only dry air or gas, thus they do not require an aging management review. **(Ref. 7, 20, 21)**

3.1.60 Stator Cooling (SC)

The purpose of the SC system is to provide cooling for the stator winding of the main generator. Some components in this nonsafety-related system are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the safety class boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 7, 20, 21, 47, 68)**

The remaining passive mechanical components in this system are in the turbine building in areas that cannot affect safety-related components, thus they do not require aging management review. **(Ref. 7, 20, 21)**

3.1.61 Security Equipment (SEC)

The purpose of SEC is to provide for station security. In the component database, this system includes the John Deere diesel engine and security equipment such as doors, cameras, and monitors. The passive mechanical components in this system are in the John Deere diesel building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-15, Fuel Oil System, and AMRM-21, The John Deere Diesel. This system does not require further aging management review since there are no other passive mechanical components besides those associated with the John Deere diesel. **(Ref. 7, 20, 21, 37, 46, 68)**

3.1.62 Standby Liquid Control (SLC)

The purpose of the SLC system is to provide a method, independent of the control rods, to shut down the reactor from full power and maintain the reactor subcritical during cooldown. The SLC system is also now credited in the LOCA analysis due to the licensing change to the alternative source term. The passive mechanical components in this system are in the primary containment and the reactor building. The components in this system meeting the scoping criteria of 54.4(a)(1) or (a)(3) are reviewed in AMRM-01, Standby Liquid Control System, and AMRM-33, Reactor Coolant System Pressure Boundary. **(Ref. 7, 20, 21, 25, 45, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the reactor building that requires aging management review due to potential spatial interaction includes stainless steel piping and tubing, valve bodies, orifices, pump casings, sight glass, strainer housings, and tanks exposed to sodium pentaborate solution and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.63 Seal Oil (SO)

The purpose of the SO system is to provide shaft sealing for the main generator. This system does not require aging management review since its passive mechanical components are in the turbine building in areas that cannot affect safety-related components. **(Ref. 7, 20, 21, 68)**

3.1.64 Sampling System (SPL)

The purpose of the SPL system is to provide a means for sampling and testing various process fluids in the station in centralized locations. The passive mechanical components in this system are in the AOG building, the radwaste building, the reactor building, the plant stack, and the turbine building. Some components in this system are located in the main condenser and MSIV leakage pathway. Failure of these components could prevent satisfactory accomplishment of a safety function and the system is therefore within the scope of license renewal per 54.4(a)(2). These components are reviewed in AMRM-26, Main Condenser and MSIV Leakage Pathway. **(Ref. 7, 20, 21, 43, 68)**

Some components in this nonsafety-related system are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the safety class boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the reactor building and plant stack that requires aging management review due to potential spatial interaction includes stainless steel tubing, stainless steel and carbon steel piping and valve bodies exposed to treated water and indoor air. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.65 Support Equipment (SUPP)

This system code in the component database consists of various tools and equipment. The passive mechanical components in this system are in various support buildings, the reactor building, and the turbine building. This system does not require aging management review since its passive mechanical components in the reactor building only contain dry air or gas. **(Ref. 7, 20, 21, 68)**

3.1.66 Service Water (SW)

The purpose of the SW system is to provide cooling water to various normal and emergency operating loads. The passive mechanical components in this system are in the AOG building, the cooling towers, the CST valve and instrument enclosure, the intake structure, the reactor building, and the turbine building. The components in this system meeting the scoping criteria

of 54.4(a)(1) or (a)(3) are reviewed in AMRM-11, Service Water Systems. **(Ref. 7, 20, 21, 33, 68)**

Some components in this system outside of the safety class pressure boundary are required to be structurally sound to maintain the integrity of safety class piping. For piping in this structural boundary, pressure integrity is not required; however, piping within the pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. These components are reviewed in Attachment 4 of this AMRM and the corresponding aging effects are listed in Attachment 2. **(Ref. 47)**

The portion of the system in the service water pump area of the intake structure and the reactor building that requires aging management review due to potential spatial interaction includes stainless steel tubing, stainless steel and carbon steel piping and valve bodies exposed to raw water, condensation, and indoor air, as well as carbon steel strainer housings exposed to raw water and condensation. Carbon steel and stainless steel bolting is exposed to indoor air. **(Ref. 20, 21)**

3.1.67 Turbine Building Closed Cooling Water (TBCCW)

The purpose of the TBCCW system is to supply demineralized water to cool various nonsafety-related auxiliary equipment located in the turbine building in support of power generation. This system does not require aging management review since its passive mechanical components are in the turbine building in areas that cannot affect safety-related components. **(Ref. 7, 20, 21, 68)**

3.1.68 Main Turbine Generator (TG)

The purpose of the TG system is to convert the thermodynamic energy of steam into a reliable source of electrical energy for use on the transmission network and the station auxiliary busses. This system does not require aging management review since the passive mechanical components are in the turbine building in areas that cannot affect safety-related components. **(Ref. 7, 20, 21, 68)**

3.1.69 Turbine Lube Oil (TLO)

The purpose of the TLO system is to provide lube oil for lubrication of the main turbine. This system does not require aging management review since its passive mechanical components are in the turbine building in areas that cannot affect safety-related components. **(Ref. 7, 20, 21, 68)**

3.2 Summary of Aging Effects Requiring Management

This section summarizes the aging effects requiring management for the material-environment combinations noted in the review of individual systems.

EPRI report 1003056 **(Ref. 3)** is used in this section to identify and evaluate aging effects requiring management. Aging effects that may result in loss of intended functions for non-Class 1 mechanical components are cracking (i.e., crack initiation, crack growth, and through-wall cracking), change in material properties, and loss of material. Attachment 2 contains a listing of component types, materials, environments, and the associated aging effects requiring management.

3.2.1 Carbon Steel Components (Exposed to Raw Water, Treated Water, Untreated Water, or Steam on Internal Surfaces and Indoor Air, Outdoor Air, or Condensation on External Surfaces)

The majority of the piping and valves in these systems are carbon steel. Several filter housings, air dryer towers, drain traps, flow elements, heat exchanger bonnets, heat exchanger shells, orifices, pump casings, sight glass housings, steam traps, strainer housings, and tanks are carbon steel. These components are exposed to raw water, treated water, untreated water, or steam on internal surfaces and indoor or outdoor air on external surfaces. Condensation may occur on un-insulated surfaces when the surface temperature is less than or equal to the dew point of the surrounding air.

Loss of material due to microbiologically influenced corrosion (MIC) or general, pitting or crevice corrosion is an aging effect requiring management for carbon steel surfaces exposed to raw water, treated water, untreated water, or steam. Loss of material from galvanic corrosion is an aging effect requiring management at interfaces between carbon steel and stainless steel components when an electrolyte is present. Loss of material from erosion or flow-accelerated corrosion is an aging effect requiring management for carbon steel surfaces at high velocity locations.

Cracking due to thermal fatigue is an aging effect requiring management since system temperature for some components is above the 220°F threshold for carbon steel thermal fatigue.

Loss of material from general corrosion is considered an aging effect requiring management for carbon steel external surfaces exposed to indoor air.

Loss of material from general, pitting, crevice and galvanic corrosion is an aging effect requiring management for carbon steel external surfaces exposed to weather and condensation.

3.2.2 Carbon Steel Components (Exposed to Lube Oil or Fuel Oil on Internal Surfaces and Indoor Air on External Surfaces)

Some piping, valves, bearing housings, heat exchanger bonnets, heat exchanger shells, pump casings, and tanks are carbon steel exposed to lube oil or fuel oil on internal surfaces and indoor air on external surfaces.

Loss of material due to MIC or general, pitting or crevice corrosion is an aging effect requiring management for carbon steel surfaces exposed to lube oil or fuel oil since water and contaminants may be present. Loss of material from galvanic corrosion is an aging effect requiring management at interfaces between carbon steel and stainless steel components. Erosion is not a concern due to the low oil velocities in these components.

Cracking due to thermal fatigue is not an aging effect requiring management since system temperatures remain below the 220°F threshold for carbon steel thermal fatigue.

Loss of material from general corrosion is considered an aging effect requiring management for carbon steel external surfaces exposed to indoor air.

3.2.3 Stainless Steel Components (Exposed to Raw Water, Treated Water, Untreated Water, or Steam on Internal Surfaces and Indoor Air, Outdoor Air, or Condensation on External Surfaces)

Some piping, tubing, and valves are stainless steel. Several filter housings, flow elements, heat exchanger bonnets, heat exchanger shells, orifices, pump casings, sight glass housings, strainer housings, and tanks, are stainless steel. These components are exposed to raw water, treated water, untreated water, or steam on internal surfaces and indoor air or outdoor air on external surfaces. Condensation may occur on un-insulated surfaces when the surface temperature is less than or equal to the dew point of the surrounding air.

Stainless steel is inherently resistant to general corrosion and erosion. Stainless steel internal surfaces are susceptible to loss of material due to MIC, pitting and crevice corrosion in the presence of high oxygen levels and contaminants. Therefore, loss of material is an aging effect requiring management for internal wetted surfaces.

Cracking due to stress corrosion and intergranular attack is an aging effect requiring management since system temperature for some components is above the 140°F threshold for these mechanisms in stainless steel.

Cracking due to thermal fatigue is an aging effect requiring management since system temperature for some components may be above the 270°F threshold for stainless steel thermal fatigue.

Loss of material from pitting and crevice corrosion is an aging effect requiring management for stainless steel external surfaces exposed to condensation or outdoor air since they are periodically wetted. Insulation is free of contaminants that could cause cracking of stainless steel. **(Ref. 61)**

3.2.4 Stainless Steel Components (Exposed to Fuel Oil on Internal Surfaces and Indoor Air on External Surfaces)

Some piping, tubing, valves, and pump casings are stainless steel exposed to fuel oil on internal surfaces and indoor air on external surfaces.

Stainless steel is inherently resistant to general corrosion and erosion. Stainless steel internal surfaces are susceptible to loss of material due to MIC, pitting and crevice corrosion if moisture

or contaminants are present in the fuel oil. Therefore, loss of material is an aging effect requiring management for internal wetted surfaces.

Cracking due to stress corrosion and intergranular attack is not an aging effect requiring management since system temperatures remain below the 140°F threshold for these mechanisms in stainless steel.

Cracking due to thermal fatigue is not an aging effect requiring management since system temperatures remains below the 270°F threshold for stainless steel thermal fatigue.

There are no aging effects requiring management for external stainless steel surfaces due to the inherent resistance of stainless steel to aging effects when not wetted or exposed to aggressive chemicals.

3.2.5 Stainless Steel Components (Exposed to Sodium Pentaborate Solution on Internal Surfaces and Indoor Air on External Surfaces)

Some piping, tubing, pump casings, and strainer housings, tanks, and valves are stainless steel exposed to sodium pentaborate solution on internal surfaces and indoor air on external surfaces.

Stainless steel is inherently resistant to general corrosion and erosion. Stainless steel internal surfaces are susceptible to loss of material due to MIC, pitting and crevice corrosion in the presence of high oxygen levels and contaminants. Therefore, loss of material from internal wetted surfaces is an aging effect requiring management.

Cracking due to stress corrosion and intergranular attack is not an aging effect requiring management since system temperature remains below the 140°F threshold for these mechanisms in stainless steel.

Cracking due to thermal fatigue is not an aging effect requiring management since system temperature remains below the 270°F threshold for stainless steel thermal fatigue.

There are no aging effects requiring management for external stainless steel surfaces due to the inherent resistance of stainless steel to aging effects when not wetted or exposed to aggressive chemicals.

3.2.6 Copper Alloy > 15% Zn Components (Exposed to Raw Water, Treated Water or Untreated Water on Internal Surfaces and Indoor Air, Outdoor Air, or Condensation on External Surfaces)

Some piping and valves are copper alloy of unknown Zn content, therefore, >15% Zn is assumed. These components are exposed to raw water or treated water or untreated water on internal surfaces and indoor air or outdoor air on external surfaces. Condensation may occur on un-insulated surfaces when the surface temperature is less than or equal to the dew point of the surrounding air.

General corrosion of internal copper alloy surfaces is not expected due to the corrosion resistance of this material. However, raw water, treated water, and untreated water can cause

pitting corrosion, crevice corrosion, and MIC on internal surfaces. Copper alloy > 15% Zn that is not inhibited may also experience selective leaching in treated water. Erosion is not expected due to low flow velocities. Therefore, loss of material due to pitting corrosion, crevice corrosion, MIC, and selective leaching is an aging effect requiring management for internal surfaces of copper alloy components.

However, copper tubing is provided per ASTM B68 which is <15% Zn. Therefore, loss of material due to selective leaching is not an aging effect requiring management for copper tubing. **(Ref. 70)**

Cracking due to stress corrosion and intergranular attack is not an aging effect requiring management for copper alloy since an ammonia environment is not present.

Cracking due to thermal fatigue is not an aging effect requiring management since system temperatures remain low.

No aging effects require management for external surfaces of copper alloy components exposed to indoor air due to the corrosion resistance of copper alloys in air.

Loss of material from pitting, and crevice corrosion is an aging effect requiring management for copper alloy external surfaces since they are exposed to condensation.

3.2.7 Copper Alloy > 15% Zn Components (Exposed to Fuel Oil or Lube Oil on Internal Surfaces and Indoor Air on External Surfaces)

Some tubing and valves are copper alloy of unknown Zn content, therefore, >15% Zn is assumed. These components are exposed to fuel oil or lube oil on internal surfaces and indoor air on external surfaces.

Loss of material from pitting, crevice corrosion, and MIC is an aging effect requiring management for copper alloy surfaces exposed to fuel oil and lube oil since water and contaminants may be present. Copper alloy > 15% Zn that is not inhibited may also experience selective leaching in oil. Erosion is not expected due to low flow velocities.

However, copper tubing is provided per ASTM B68 which is <15% Zn. Therefore, loss of material due to selective leaching is not an aging effect requiring management for copper tubing. **(Ref. 70)**

Cracking due to stress corrosion and intergranular attack is not an aging effect requiring management for copper alloy since an ammonia environment is not present.

Cracking due to thermal fatigue is not an aging effect requiring management since system temperature remains low.

No aging effects require management for external surfaces of copper alloy components exposed to indoor air due to the corrosion resistance of copper alloys in air.

Loss of material from pitting, and crevice corrosion is an aging effect requiring management for copper alloy external surfaces since they may be exposed to condensation.

3.2.8 Gray Cast Iron Components (Exposed to Raw Water on Internal Surfaces and Indoor Air on External Surfaces)

Some piping and valves in the FP system are gray cast iron exposed to raw water on internal surfaces and indoor air on external surfaces.

Loss of material from general corrosion is considered an aging effect requiring management for gray cast iron external surfaces exposed to indoor air.

Loss of material due to microbiologically influenced corrosion (MIC) and general, pitting and crevice corrosion is an aging effect requiring management for gray cast iron surfaces exposed to raw water. Loss of material due to selective leaching is an aging effect requiring management for gray cast iron components. Erosion is not expected since this system is normally in standby.

Cracking due to thermal fatigue is not an aging effect requiring management since system temperature remains below the 220°F threshold for gray cast iron thermal fatigue.

3.2.9 Glass

There are no aging effects requiring management for glass in a sight glass since glass is resistant to aging effects when not exposed to very hot water, hydrofluoric acids or caustics.

3.2.10 Bolting

Loss of material from general corrosion is considered an aging effect requiring management for carbon steel bolting exposed to indoor air. Loss of material from general corrosion, pitting and crevice corrosion, MIC and galvanic corrosion is considered an aging effect requiring management for carbon steel bolting exposed to outdoor air.

Loss of material is not an aging effect requiring management for stainless steel in an indoor environment. Loss of material from MIC, pitting and crevice corrosion is an aging effect requiring management for stainless steel bolting in outdoor air.

4.0 Demonstration That Aging Effects Will Be Managed

Section 2.0 described the method for determining the liquid/steam filled systems or portions of systems requiring a review per 54.4(a)(2). Section 3.0 documented the review of the systems and the corresponding component types that are subject to aging management review. For those component types subject to aging management review, section 3.0 also documented the determination of aging effects requiring management. The aging management review is completed by demonstrating that existing programs, when continued into the period of extended operation, can manage the aging effects identified in section 3.0. No further action is required for license renewal when the evaluation of an existing program demonstrates that it is adequate to manage the aging effect such that corrective action may be taken prior to loss of the system intended functions. Alternately, if existing programs cannot be shown to manage the aging effects for the period of extended operation, then action will be proposed to augment existing or create new programs to manage the identified effects of aging.

Demonstration for the purposes of this license renewal technical evaluation is accomplished by establishing a clear relationship among

1) the components under review,

2) the aging effects on these items caused by the material-environment-stress combinations which, if undetected, could result in loss of the intended function such that the system could not perform its function(s) within the scope of license renewal in the period of extended operation, and

3) the credited aging management programs whose actions serve to preserve the system intended function(s) for the period of extended operation.

As documented in section 2.0, the systems requiring a review per 54.4 (a)(2) are those where nonsafety-related SSCs are required to remain functional to support a safety function, and those with the potential for physical interaction (directly-connected and spatial). Passive long-lived components performing an intended function within these systems are subject to aging management review.

Attachment 2 lists component types and identifies the aging effects requiring management for each material and environment combination. The Diesel Fuel Monitoring Program, Fire Water System Program, Flow-Accelerated Corrosion Program, Instrument Air Quality Program, Oil Analysis Program, One-Time Inspection Program, Periodic Surveillance and Preventive Maintenance Program, Selective Leaching Program, Service Water Integrity Program, System Walkdown Program, Water Chemistry Control – Auxiliary Systems Program, Water Chemistry Control – BWR Program, and Water Chemistry Control – Closed Cooling Water Program in combination will manage the effects of aging, thereby precluding loss of the intended functions of the system.

Sections 4.1 through 4.13 provide the clear relationship between the component, the aging effect, and the aging management program actions which preserve the intended functions for the period of extended operation. Section 4.14 identifies applicable time-limited aging analyses associated with 54.4(a)(2) systems. For a comprehensive review of programs credited for license renewal of VYNPS and a demonstration of how these programs will manage aging

effects, see VYNPS Report LRPD-02, Aging Management Program Evaluation Results. **(Ref. 19)**

4.1 Diesel Fuel Monitoring Program

The Diesel Fuel Monitoring Program helps to manage loss of material for carbon steel, stainless steel, and copper alloy components wetted by fuel oil by ensuring that diesel fuel quality is maintained. This program does *not* totally eliminate water from the bottom of large storage tanks nor totally manage loss of material without assistance from other aging management programs.

This program applies to component types indicated on Attachment 2. For additional information on this program, see VYNPS Report LRPD-02, Aging Management Program Evaluation Results. **(Ref. 19)**

4.2 Fire Water System Program

The Fire Water System Program includes system flow testing, wall thinning monitoring and visual inspections to manage aging effects on fire protection system components. The Fire Water System Program manages loss of material from internal and external surfaces of carbon steel and gray cast iron piping and other components by wall thinning monitoring and visual inspection.

This program applies to component types indicated on Attachment 2. For additional information on this program, see VYNPS Report LRPD-02, Aging Management Program Evaluation Results. **(Ref. 19)**

4.3 Flow-Accelerated Corrosion Program

The Flow-Accelerated Corrosion Program determines locations likely to experience loss of material from flow-accelerated corrosion and monitors these locations for wall thickness changes. This program manages loss of material from internal surfaces of carbon steel components.

This program applies to component types indicated on Attachment 2. For additional information on this program, see VYNPS Report LRPD-02, Aging Management Program Evaluation Results. **(Ref. 19)**

4.4 Instrument Air Quality Program

The Instrument Air Quality Program maintains the IA system free from contaminants and MIC, thereby managing loss of material for carbon steel components in the IA system.

This program applies to component types indicated on Attachment 2. For additional information on this program, see VYNPS Report LRPD-02, Aging Management Program Evaluation Results. **(Ref. 19)**

4.5 Oil Analysis Program

The Oil Analysis Program maintains oil systems free of contaminants (primarily water and particulates) thereby preserving an environment that is not conducive to aging mechanisms. This program manages loss of material for carbon steel and copper alloy components wetted by oil.

This program applies to component types indicated on Attachment 2. For additional information on this program, see VYNPS Report LRPD-02, Aging Management Program Evaluation Results. **(Ref. 19)**

4.6 One-Time Inspection Program

The One-Time Inspection Program provides assurance that either aging is not occurring or that aging is so insignificant that there is no need to manage the effects of aging for the period of extended operation. By inspecting a representative sample of the system population, the One-Time Inspection Program will verify the absence of significant loss of material for internal carbon steel, stainless steel, and copper alloy surfaces of the PW, RDW, and RIP systems exposed to untreated water.

This program applies to component types indicated on Attachment 2. For additional information on this program, see VYNPS Report LRPD-02, Aging Management Program Evaluation Results. **(Ref. 19)**

4.7 Periodic Surveillance and Preventive Maintenance Program

The Periodic Surveillance and Preventive Maintenance Program includes periodic inspections to manage loss of material for carbon steel and copper alloy components.

The CW, DG, and IA systems are periodically inspected using visual or other NDE techniques to detect and manage loss of material.

For additional information on this program, see VYNPS Report LRPD-02, Aging Management Program Evaluation Results. **(Ref. 19)**

4.8 Selective Leaching Program

The Selective Leaching Program ensures the integrity of components made from gray cast iron or copper alloy susceptible to selective leaching that are exposed to raw water, untreated water, treated water, steam, untreated air, or soil (groundwater). By one-time visual inspection and testing of a representative sample of the component population, the Selective Leaching Program will verify the absence of significant loss of material due to selective leaching of gray cast iron and copper alloy >15% zinc surfaces exposed to raw water or treated water in the following systems: AOG, DW, FP.

This program applies to component types indicated on Attachment 2. For additional information on this program, see VYNPS Report LRPD-02, Aging Management Program Evaluation Results. **(Ref. 19)**

4.9 Service Water Integrity Program

The Service Water Integrity Program includes condition and performance monitoring activities to inspect components for erosion and corrosion. Chemical treatment using biocides and chlorine and periodic cleaning and flushing of redundant or infrequently used loops are additional methods used under this program to manage loss of material of carbon steel, stainless steel, and copper alloy components exposed to raw water in the HVAC, MGLO, RHRSW, SBFPC, SBGT, and SW systems.

This program applies to component types indicated on Attachment 2. For additional information on this program, see VYNPS Report LRPD-02, Aging Management Program Evaluation Results. **(Ref. 19)**

4.10 System Walkdown Program

Under the System Walkdown Program, visual inspections are conducted to manage aging effects on components. The System Walkdown Program manages loss of material for external carbon steel, gray cast iron, stainless steel, and copper alloy components by visual inspection of external surfaces. Since some internal carbon steel surfaces are exposed to the same indoor air environment as the external surfaces, the external surfaces will be representative of the internal surfaces. Thus, loss of material on internal carbon steel surfaces in an indoor air environment is also managed by the System Walkdown Program.

This program applies to component types indicated on Attachment 2. For additional information on this program, see VYNPS Report LRPD-02, Aging Management Program Evaluation Results. **(Ref. 19)**

4.11 Water Chemistry Control – Auxiliary Systems Program

To manage loss of material on carbon steel, stainless steel, and copper alloy components, levels of contaminants are minimized by the Water Chemistry Control – Auxiliary Systems Program. The Water Chemistry Control – One-Time Inspection Program utilizes inspections or non-destructive evaluations of representative samples to verify that the Water Chemistry Control – Auxiliary Systems Program has been effective at managing loss of material for carbon steel piping and components.

This program applies to component types indicated on Attachment 2. For additional information on this program and the Water Chemistry Control – One-Time Inspection Program, see VYNPS Report LRPD-02, Aging Management Program Evaluation Results. **(Ref. 19)**

4.12 Water Chemistry Control – BWR Program

To manage loss of material and cracking on carbon steel, stainless steel, and copper alloy components, levels of contaminants are minimized by the Water Chemistry Control – BWR Program. The Water Chemistry Control – One-Time Inspection Program utilizes inspections or non-destructive evaluations of representative samples to verify that the Water Chemistry Control – BWR Program has been effective at managing loss of material for carbon steel, stainless steel, and copper alloy piping and components.

This program applies to component types indicated on Attachment 2. For additional information on this program and the Water Chemistry Control – One-Time Inspection Program, see VYNPS Report LRPD-02, Aging Management Program Evaluation Results. **(Ref. 19)**

4.13 Water Chemistry Control – Closed Cooling Water Program

The Water Chemistry Control – Closed Cooling Water Program manages loss of material of carbon steel, stainless steel, and copper alloy components by minimizing levels of contaminants in the water. The Water Chemistry Control – One-Time Inspection Program utilizes inspections or non-destructive evaluations of representative samples to verify that the Water Chemistry Control – Closed Cooling Water Program has been effective at managing loss of material for carbon steel piping, valve bodies, and other components.

This program applies to component types indicated on Attachment 2. For additional information on this program and the Water Chemistry Control – One-Time Inspection Program, see VYNPS Report LRPD-02, Aging Management Program Evaluation Results. **(Ref. 19)**

4.14 Time-Limited Aging Analyses

Metal fatigue is a TLAA applicable to portions of the HPCI, MS, NB, PASS, and RCIC systems subjected to elevated temperatures.

See VYNPS Reports LRPD-03, TLAA and Exemption Evaluation Results, and LRPD-04, TLAA – Mechanical Fatigue, for review of time-limited aging analyses. **(Ref. 62, 63)**

5.0 Summary and Conclusions

This report documents the review of systems at VYNPS in order to determine which systems are in scope per 54.4(a)(2) and require aging management review. The system level results of this review are documented in Attachment 1. Systems with components requiring review were further evaluated in order to identify the aging effects requiring management. Section 4.0 then identified the aging management programs that will manage the effects of aging. The following aging management programs address the aging effects requiring management for the nonsafety-related SC that can affect safety-related SC.

- Diesel Fuel Monitoring Program
- Fire Water System Program
- Flow-Accelerated Corrosion Program
- Instrument Air Quality Program
- Oil Analysis Program
- One-Time Inspection Program
- Periodic Surveillance and Preventive Maintenance Program
- Selective Leaching Program
- Service Water Integrity Program
- System Walkdown Program
- Water Chemistry Control – Auxiliary Systems Program
- Water Chemistry Control – BWR Program
- Water Chemistry Control – Closed Cooling Water

For additional review of programs credited for license renewal of VYNPS, see VYNPS Report LRPD-02, Aging Management Program Evaluation Results. **(Ref. 19)**

Attachment 2 contains the aging management review results for the components types in the systems in scope for 54.4(a)(2).

In conclusion, the programs described in Section 4.0 will provide reasonable assurance that the effects of aging on the VYNPS passive mechanical nonsafety-related systems and components affecting safety-related systems will be managed such that the intended functions can be maintained consistent with the current licensing basis throughout the period of extended operation.

6.0 References

1. VYNPS Report LRPG-01, License Renewal Project Plan

2. NEI Letter, to Dr. P.T. Kuo from Alan Nelson, February 24, 2003, Industry Guidance on Revised 54.4 (a)(2) Scoping Criterion (Non-Safety Affecting Safety)

3. *Non-Class 1 Mechanical Implementation Guideline and Mechanical Tools*, Revision 3, EPRI, Palo Alto, CA: 2001. 1003056 (The Mechanical Tools)

4. Letter from Grimes (NRC) to Nelson (NEI), Guidance on the Identification and Treatment of Structures, Systems, and Components which Meet 10 CFR 54.4(a)(2), dated March 15, 2002

5. NUREG CR-6239, Survey of Strong Motion Earthquake Effects on Thermal Power Plants in California with Emphasis on Piping Systems

6. Letter from Grimes (NRC) to Walters (NEI), "License Renewal Issue No. 98-0082, Scoping Guidance, dated August 5, 1999.

7. VYNPS Report LRPD-01, System and Structure Scoping Results

8. NRC Generic Letter 88-14, Instrument Air System Supply Problems Affecting Safety-Related Equipment

9. NRC Information Notice 81-38, Potentially Significant Equipment Failures Resulting From Contamination of Air-Operated Systems

10. NRC Information Notice 87-28, Air Systems Problems at U.S. Light Water Reactors

11. NRC Information Notice 99-01, Deterioration of High Efficiency Particulate Air Filters in a Pressurized Water Reactor Containment Fan Cooler Unit

12. INPO Significant Operating Experience Report 88-01, Instrument Air System Failures

13. NRC Information Notice 89-26, Instrument Air Supply to Safety-Related Equipment

14. INPO Significant Event Report 1-99, Air-Operated Valve Performance

15. NRC Information Notice 02-29, Recent Design Problems in Safety Functions of Pneumatic Systems

16. VYNPS Report LRPD-05, Operating Experience Review Results

17. Document AE, VYNPS Design Basis Document for Accident-Event Combinations, Rev. 0, 5/4/00

18. VYNPS Environmental Qualification Program Manual, Rev. 18

19. VYNPS Report LRPD-02, Aging Management Program Evaluation Results

20. VYNPS Flow and General Arrangement Diagrams, G-1911XX and G-1912XX series

21. VYNPS Enterprise Maintenance, Planning and Control (EMPAC) component database

22. AMRC-06, Aging Management Review of Bulk Commodities, Rev. 0

23. *Industry Guideline for Implementing the Requirements of 10 CFR Part 54 – The License Renewal Rule*, NEI 95-10, Revision 6, June 2005

24. NRC Letter, to Alan Nelson from Dr. P.T. Kuo, March 21, 2003, Staff Comments to "Industry Guidance on Revised 54.4 (a)(2) Scoping Criterion (Non-Safety Affecting Safety)" for License Renewal

25. AMRM-01, Aging Management Review of the Standby Liquid Control System, Rev. 0

26. AMRM-02, Aging Management Review of the Residual Heat Removal System, Rev. 0

27. AMRM-03, Aging Management Review of the Core Spray System, Rev. 0

28. AMRM-04, Aging Management Review of the Automatic Depressurization System, Rev. 0

29. AMRM-05, Aging Management Review of the High Pressure Coolant Injection System, Rev. 0

30. AMRM-06, Aging Management Review of the Reactor Core Isolation Cooling System, Rev. 0

31. AMRM-07, Aging Management Review of the Standby Gas Treatment System, Rev. 0

32. AMRM-08, Aging Management Review of the Primary Containment Atmosphere Control and Containment Atmosphere Dilution Systems, Rev. 0

33. AMRM-11, Aging Management Review of the Service Water Systems, Rev. 0

34. AMRM-12, Aging Management Review of the Reactor Building Closed Cooling Water System, Rev. 0

35. AMRM-13, Aging Management Review of the Emergency Diesel Generator System, Rev. 0

36. AMRM-14, Aging Management Review of the Fuel Pool Cooling Systems, Rev. 0

37. AMRM-15, Aging Management Review of the Fuel Oil System, Rev. 0

38. AMRM-16, Aging Management Review of the Instrument Air System, Rev. 0

39. AMRM-17, Aging Management Review of the Fire Protection – Water System, Rev. 0

40. AMRM-18, Aging Management Review of the Fire Protection – CO2 System, Rev. 0

41. AMRM-19, Aging Management Review of the Heating, Ventilation, and Air Conditioning Systems, Rev. 0

42. AMRM-20, Aging Management Review of the Primary Containment Penetrations, Rev. 0.

43. AMRM-26, Aging Management Review of the Main Condenser and MSIV Leakage Pathway, Rev. 0

44. AMRM-32, Aging Management Review of the Reactor Vessel Internals, Rev. 0

45. AMRM-33, Aging Management Review of Reactor Coolant System Pressure Boundary, Rev. 0

46. AMRM-21, Aging Management Review of the John Deere Diesel, Rev. 0

47. ENN-MS-S-009-VY, Vermont Yankee Site Specific Guidance and System Safety Function Sheets, Rev. 0, 3/22/05.

48. VYEM 0229, Rev. 1, Quincy Compressor (C-3-1A and C-3-1B), 02/28/02

49. Mechanical Equipment Drawings:
    5920-1714
    5920-2639 FPC Heat Exchangers
    5920-2649
    5920-2929
    5920-3581
    5920-3585
    5920-4442
    5920-5017
    5920-5396 RB Equipment Sump Cooling Coils
    5920-5587
    5920-6966 FPC Heat Exchangers
    8532-10

50. VYEM 0005, RWCU Regenerative Heat Exchanger and SBFPC Heat Exchanger Instruction Manual, 09/13/01

51. VYEM 0099, H.K. Porter Air Conditioning Units – Operating and Maintenance Instructions

52. VYNPS photographs stored on vyshared1/maintenance public folders/shortcut to Camera 95

53. Spreadsheet produced during drawing review with specific drawing locations, components and other information. [NS att to SR drawing review.xls]

54. JO 96-0181, Replacement Pump P-104-1A

55. EDCR 95-402, Feedwater Heater E-5-1A and E-5-1B Replacement

56. Drawing B-191261, Instrument Installation Details

57. Document SADBD, Topical Design Basis Document for Safety Analysis, Rev. 4, 9/29/05

58. VYNPP Safe Shutdown Capability Analysis, Rev. 7, 6/26/04

59. VY Isometric Drawings:
   a. VYI-SW-PART3 sh.2
   b. VYI-SW-PART8&8A sh.1
   c. VYI-SW-PART15 sh.2
   d. VYI-SW-PART15 sh.1
   e. VYI-RCW-PART11 sh.2
   f. VYI-FDW-PART5B
   g. VYI-FDW-PART5C sh.1
   h. VYI-CUW-PART2
   i. VYI-CS-PART11
   j. VYI-CS-PART12
   k. VYI-CS-PART10
   l. VYI-CS-PART9
   m. VYI-CS-PART11C
   n. VYI-CS-10B
   o. VYI-CS-10A
   p. VYI-HPCI-PART4
   q. VYI-HPCI-PART3A sh.2
   r. VYI-RHR-PART11B sh.1
   s. VYI-RHR-PART11B sh.2
   t. VYI-RHR-PART7A
   u. VYI-RHR-PART11A
   v. VYI-RHR-PART5A
   w. VYI-RHR-PART11D
   x. VYI-RHR-PART11
   y. VYI-RHR-PART12 sh.3
   z. VYI-RHR-PART12 sh.1
   aa. VYI-RHR-PART12 sh.2
   bb. VYI-RHR-PART12 sh.4
   cc. VYI-RHR-PART13 sh.1
   dd. VYI-RHR-PART13 sh.2
   ee. VYI-RHR-PART16 sh.4
   ff. VYI-RHR-PART16 sh.2
   gg. VYI-RHR-PART16 sh.6
   hh. VYI-RCIC-PART4 sh.1
   ii. VYI-RCIC-PART3A sh.2
   jj. VYI-AC-PART3&4 sh.1

60. BWR QC-10, Ebasco Piping Specification, 3/15/70

61. VYNP-III-I-1, Ebasco Insulation Specification, Rev. 2, 12/23/69

62. VYNPS Report LRPD-03, TLAA and Exemption Evaluation Results

63. VYNPS Report LRPD-04, TLAA – Mechanical Fatigue

64. PMCR 2003-0886, IST Replacement of HPCI Rupture Disk

65. AMRM-31, Aging Management Review of the Reactor Pressure Vessel, Rev. 0

66. VYNPS Updated Final Safety Analysis Report (UFSAR) Section 12.2.2

67. VYNP-III-H-4, Miscellaneous Heat Exchangers Specification, Rev. 0, 9/18/68

68. Document IF, VYNPS Design Basis Document for Internal Flooding, Rev. 1, 6/29/05

69. Technical Evaluation No. TE-2000-014, Technical Evaluation for Pipe Whip and Jet Impingement Design Bases, Rev. 0, 9/27/01

70. *White Paper on Copper*, Copper Development Association, New York, NY: 2003

System Code	System Name	In scope per 54.4(a)(2) due to interaction of type: functional – 1 [AMRM-26] structural – 2 [Attachment 4] spatial – 3 [Section 3.0]
101[1]	MS, ES, & AS Instruments	1
103	HD & HV Instruments	No
105	SA & IA Instruments	No
107	CST & DW Instruments	No
AE	Air Evacuation	No
AOG	Augmented Off Gas	1, 3
AOGCW	AOG Cooling Water	No
AS	Auxiliary Steam	1
BLD	Buildings & Structures	No
C	Condensate	1, 2, 3
CAD	Containment Air Dilution	2
CD	Condensate Demineralizer	2
CHEM	Chemistry Equip & Supp	No
CRD	Control Rod Drive	2, 3
CS	Core Spray	2, 3
CST	Condensate Storage and Transfer	2, 3
CUFD	RWCU Filter Demineralizer	3
CW	Circulating Water	3
CWP	Circulating Water Priming	No
DG	Diesel Generator & Auxiliaries	2, 3
DLO	Diesel Lube Oil	2
DW	Demineralized Water	2, 3
ES	Extraction Steam	No
FDW	Feedwater	3
FO	Fuel Oil	2, 3
FP	Fire Protection	2, 3
FPC	Fuel Pool Cooling	2, 3
FPFD	FPC Filter Demineralizer	3
FWC	Feedwater Controls	No

[1] System codes 102 and 104 still have Maintenance Rule documents but have been deleted from the component database.

System Code	System Name	In scope per 54.4(a)(2) due to interaction of type: functional – 1 [AMRM-26] structural – 2 [Attachment 4] spatial – 3 [Section 3.0]
H2	Hydrogen	No
HB	House Heating Boiler	2, 3
HCU	Hydraulic Control Units	3
HD	Heater Drain	No
HPCI	High Pressure Cool Inject	2, 3
HV	Heater Vents	No
HVAC	Heat Vent & Air Condition	2, 3
HWC	Hydrogen Water Chemistry	No
IA	Instrument Air	2, 3
MGLO	MG Lube Oil	2, 3
MS	Main Steam	1
MUD	Make-up Demineralizer	No
N2	Nitrogen Supply	2
NB	Nuclear Boiler	1, 2, 3
NM	Neutron Monitoring	2
OIS	Oxygen Injection	No
PASS	Post Accident Sampling	2, 3
PCAC	Prim Contain Atmos Cont	2
PW	Potable Water	3
RBCCW	Rx Bldg Closed Cooling Water	2, 3
RCIC	Rx Core Isolation Cooling	2, 3
RDW	Radwaste Liquid & Solid	2, 3
RHR	Residual Heat Removal	2, 3
RHRSW	RHR Service Water	2, 3
RIP	Equipment Retired in Place	2
RPI	Refuel Platform & Inst	No
RWCU	Reactor Water Clean Up	2, 3
SA	Service Air	No
SBFPC	Standby Fuel Pool Cooling	2
SBGT	Standby Gas Treatment	2
SC	Stator Cooling	2

System Code	System Name	In scope per 54.4(a)(2) due to interaction of type: functional – 1 [AMRM-26] structural – 2 [Attachment 4] spatial – 3 [Section 3.0]
SEC	Security Equipment	No
SLC	Standby Liquid Control	2, 3
SO	Seal Oil	No
SPL	Sampling System	1, 2, 3
SUPP	Support Equipment	No
SW	Service Water	2, 3
TBCCW	T Bldg Closed Cooling Wtr	No
TG	Main Turbine Generator	No
TLO	Turbine Lube Oil	No

3.1.6 Augmented Off Gas (AOG)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Filter housing	Pressure boundary	Copper alloy>15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Selective leaching
					Water chemistry control – BWR
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
Tank	Pressure boundary	Copper alloy>15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Selective leaching
					Water chemistry control – BWR
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.6 Augmented Off Gas (AOG) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Valve body	Pressure boundary	Copper alloy>15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Selective leaching
					Water chemistry control – BWR

3.1.10 Condensate (C)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.11 Containment Air Dilution (CAD)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Duct	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – indoor (int)	Loss of material	System walkdown
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – indoor (int)	Loss of material	System walkdown
Tubing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – indoor (int)	Loss of material	System walkdown
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – indoor (int)	Loss of material	System walkdown

3.1.12 Condensate Demineralizer (CD)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
Strainer housing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.14 Control Rod Drive (CRD)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Filter housing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Orifice	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control –BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.14 Control Rod Drive (CRD) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Pump casing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.14 Control Rod Drive (CRD) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Strainer housing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Tank	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.14 Control Rod Drive (CRD) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.15 Core Spray (CS)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Bearing housing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Lube oil (int)	Loss of material	Oil analysis
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Lube oil (int)	Loss of material	Oil analysis
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.15 Core Spray (CS) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Tubing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Lube oil (int)	Loss of material	Oil analysis
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Copper alloy>15% zn	Air – indoor (ext)	None	None
			Lube oil (int)	Loss of material	Oil analysis
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.16 Condensate Storage and Transfer (CST)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – outdoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
			Air – outdoor (ext)	Loss of material	System walkdown
Orifice	Pressure boundary	Carbon steel	Air – outdoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – outdoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
Pump casing	Pressure boundary	Carbon steel	Air – outdoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.16 Condensate Storage and Transfer (CST) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Air – outdoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – outdoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.17 RWCU Filter Demineralizer (CUFD)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None

3.1.17 RWCU Filter Demineralizer (CUFD) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Filter housing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Orifice	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control –BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.17 RWCU Filter Demineralizer (CUFD) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Pump casing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Sight glass	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Glass	Air – indoor (ext)	None	None
			Treated water (int)	None	None
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Strainer housing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.17 RWCU Filter Demineralizer (CUFD) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Tank	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.18 Circulating Water (CW)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – outdoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – outdoor (ext)	None	None
Piping	Pressure boundary	Carbon steel	Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Periodic surveillance and preventive maintenance
Pump casing	Pressure boundary	Carbon steel	Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Periodic surveillance and preventive maintenance
Tubing	Pressure boundary	Copper alloy< 15% zn	Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Periodic surveillance and preventive maintenance
Valve body	Pressure boundary	Carbon steel	Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Periodic surveillance and preventive maintenance

3.1.20 Diesel Generator & Auxiliaries (DG)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Compressor housing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – closed cooling water
			Untreated air (int)	Loss of material	Periodic surveillance and preventive maintenance
Filter housing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Untreated air (int)	Loss of material	Periodic surveillance and preventive maintenance
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Fuel oil (int)	Loss of material	Diesel fuel monitoring
			Treated water (int)	Loss of material	Water chemistry control – closed cooling water
			Untreated air (int)	Loss of material	Periodic surveillance and preventive maintenance

3.1.20 Diesel Generator & Auxiliaries (DG) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Tank	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Fuel oil (int)	Loss of material	Diesel fuel monitoring
			Treated water (int)	Loss of material	Water chemistry control – closed cooling water
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Fuel oil (int)	Loss of material	Diesel fuel monitoring
			Treated water (int)	Loss of material	Water chemistry control – closed cooling water
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Fuel oil (int)	Loss of material	Diesel fuel monitoring
			Treated water (int)	Loss of material	Water chemistry control – closed cooling water
			Untreated air (int)	Loss of material	Periodic surveillance and preventive maintenance

3.1.21 Diesel Lube Oil (DLO)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Lube oil (int)	Loss of material	Oil analysis
Tubing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Lube oil (int)	Loss of material	Oil analysis

3.1.22 Demineralized Water (DW)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Orifice	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – outdoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.22 Demineralized Water (DW) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – outdoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Copper alloy>15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Selective leaching
					Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Pump casing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – outdoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.22 Demineralized Water (DW) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Tank	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
Tubing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.22 Demineralized Water (DW) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Copper alloy>15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Selective leaching
					Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.24 Feedwater (FDW)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None

3.1.24 Feedwater (FDW) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water > 220°f (int)	Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Treated water > 270°f (int)	Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water > 220°f (int)	Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR

3.1.25 Fuel Oil (FO)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Fuel oil (int)	Loss of material	Diesel fuel monitoring
		Stainless steel	Air – indoor (ext)	None	None
			Fuel oil (int)	Loss of material	Diesel fuel monitoring
Pump casing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Fuel oil (int)	Loss of material	Diesel fuel monitoring
		Stainless steel	Air – indoor (ext)	None	None
			Fuel oil (int)	Loss of material	Diesel fuel monitoring
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Fuel oil (int)	Loss of material	Diesel fuel monitoring
		Stainless steel	Air – indoor (ext)	None	None
			Fuel oil (int)	Loss of material	Diesel fuel monitoring

3.1.25 Fuel Oil (FO) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Fuel oil (int)	Loss of material	Diesel fuel monitoring
		Stainless steel	Air – indoor (ext)	None	None
			Fuel oil (int)	Loss of material	Diesel fuel monitoring

3.1.26 Fire Protection (FP)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – outdoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
			Air – outdoor (ext)	Loss of material	System walkdown
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – outdoor (ext)	Loss of material	System walkdown

3.1.26 Fire Protection (FP) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Piping	Pressure boundary	Carbon steel	Raw water (int)	Loss of material	Fire water system
		Gray cast iron	Air – indoor (ext)	Loss of material	System walkdown
			Air – outdoor (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Fire water system
					Selective leaching
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Air – outdoor (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Fire water system
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – outdoor (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Fire water system

3.1.26 Fire Protection (FP) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Valve body	Pressure boundary	Gray cast iron	Air – indoor (ext)	Loss of material	System walkdown
			Air – outdoor (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Fire water system
					Selective leaching

3.1.27 Fuel Pool Cooling (FPC)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Filter housing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.27 Fuel Pool Cooling (FPC) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Heat exchanger (shell)	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Pump casing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.27 Fuel Pool Cooling (FPC) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Tubing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.28 Filter Demineralizer (FPFD)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.31 House Heating Boiler (HB)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Condensation (ext)	Loss of material	System walkdown
			Steam > 220° F (int)	Cracking - fatigue	Metal tatigue TLAA
				Loss of material	Flow accelerated corrosion
					Water chemistry control – auxiliary systems
			Treated water (int)	Loss of material	Water chemistry control – auxiliary systems
Pump casing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Condensation (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – auxiliary systems

3.1.31 House Heating Boiler (HB) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Steam trap	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Condensation (ext)	Loss of material	System walkdown
			Steam> 220° F (int)	Loss of material	Flow accelerated corrosion
					Water chemistry control – auxiliary systems
				Cracking-fatigue	Metal fatigue TLAA
			Treated water (int)	Loss of material	Water chemistry control – auxiliary systems
Tank	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Condensation (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – auxiliary systems

3.1.31 House Heating Boiler (HB) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Condensation (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – auxiliary systems
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Condensation (ext)	Loss of material	System walkdown
			Steam > 220°F(int)	Loss of material	Flow accelerated corrosion
					Water chemistry control – auxiliary systems
				Cracking-fatigue	Metal fatigue TLAA
			Treated water (int)	Loss of material	Water chemistry control – auxiliary systems

3.1.32 Hydraulic Control Units (HCU)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Filter housing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Piping	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.34 High Pressure Coolant Injection (HPCI)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Steam > 270˚f (int)	Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Flow accelerated corrosion
					Water chemistry control – BWR
			Treated water (int)	Loss of material	Water chemistry control – BWR
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Steam > 270˚f (int)	Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Flow accelerated corrosion
					Water chemistry control – BWR
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.36 Heating, Ventilation & Air Conditioning (HVAC)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity
Heat exchanger (tubes)	Pressure Boundary	Carbon Steel	Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Raw water (int)	Loss of material	Service water integrity
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity

3.1.38 Instrument Air (IA)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Compressor housing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – closed cooling water
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Lube oil (int)	Loss of material	Oil analysis
			Treated air (int)	Loss of material	Instrument air quality
			Treated water (int)	Loss of material	Water chemistry control – BWR
Strainer housing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated air (int)	Loss of material	Instrument air quality
Tank	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Untreated water (int)	Loss of material	Periodic surveillance and preventive maintenance

3.1.38 Instrument Air (IA) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Trap	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Untreated water (int)	Loss of material	Periodic surveillance and preventive maintenance
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated air (int)	Loss of material	Instrument air quality
			Untreated water (int)	Loss of material	Periodic surveillance and preventive maintenance

3.1.39 MG Lube Oil (MGLO)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Heat exchanger (shell)	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Lube oil (int)	Loss of material	Oil analysis
			Raw water (int)	Loss of material	Service water integrity
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Lube oil (int)	Loss of material	Oil analysis
Pump casing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Lube oil (int)	Loss of material	Oil analysis

3.1.39 MG Lube Oil (MGLO) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Lube oil (int)	Loss of material	Oil analysis
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Lube oil (int)	Loss of material	Oil analysis

3.1.42 Nitrogen Supply (N2)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Piping	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Nitrogen (int)	None	None
Tubing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Nitrogen (int)	None	None
Valve body	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Nitrogen (int)	None	None

3.1.43 Nuclear Boiler (NB)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Filter housing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.43 Nuclear Boiler (NB) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Flow element	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water > 270˚f (int)	Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water > 270°f (int)	Cracking	Water chemistry control – BWR
				Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR
			Treated water (int)	Loss of material	Water chemistry control – BWR
Orifice	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.43 Nuclear Boiler (NB) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water > 270˚f (int)	Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Flow accelerated corrosion
					Water chemistry control – BWR
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water > 270°f (int)	Cracking	Water chemistry control – BWR
				Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.43 Nuclear Boiler (NB) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Tubing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water > 270°f (int)	Cracking	Water chemistry control – BWR
				Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR
			Treated water (int)	Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water > 270°f (int)	Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Flow accelerated corrosion
					Water chemistry control – BWR
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water > 270°f (int)	Cracking	Water chemistry control – BWR
				Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.44 Neutron Monitoring (NM)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Piping	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Nitrogen (int)	None	None
Tubing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Nitrogen (int)	None	None
Valve body	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Nitrogen (int)	None	None

3.1.46 Post-Accident Sampling System (PASS)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Tubing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.47 Primary Containment Atmospheric Control (PCAC)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – indoor (int)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Orifice	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – indoor (int)	Loss of material	System walkdown
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – indoor (int)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.48 Potable Water (PW)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Untreated water (int)	Loss of material	One-time inspection

3.1.49 Reactor Building Closed Cooling Water (RBCCW)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Heat exchanger (shell)	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – closed cooling water
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – closed cooling water
Pump casing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – closed cooling water
Sight glass	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – closed cooling water

3.1.49 Reactor Building Closed Cooling Water (RBCCW) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Sight glass	Pressure boundary	Glass	Air – indoor (ext)	None	None
			Treated water (int)	None	None
Strainer housing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – closed cooling water
Tank	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – closed cooling water
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – closed cooling water
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – closed cooling water

3.1.50 Reactor Core Isolation Cooling (RCIC)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Steam > 270˚f (int)	Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Flow accelerated corrosion
					Water chemistry control – BWR
			Treated water (int)	Loss of material	Water chemistry control – BWR
Rupture Disk	Pressure Boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Steam > 270˚f (int)	Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR

3.1.50 Reactor Core Isolation Cooling (RCIC) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Steam > 270˚f (int)	Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Flow accelerated corrosion
					Water chemistry control – BWR
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.51 Radwaste, Liquid & Solid (RDW)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Orifice	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Untreated water (int)	Loss of material	One-time inspection
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
			Untreated water (int)	Loss of material	One-time inspection
Pump casing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
			Untreated water (int)	Loss of material	One-time inspection
Strainer housing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Untreated water (int)	Loss of material	One-time inspection

3.1.51 Radwaste, Liquid & Solid (RDW) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Tank	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
			Untreated water (int)	Loss of material	One-time inspection
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
			Untreated water (int)	Loss of material	One-time inspection
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
			Untreated water (int)	Loss of material	One-time inspection

3.1.52 Residual Heat Removal (RHR)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None

3.1.52 Residual Heat Removal (RHR) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Orifice	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.53 RHR Service Water (RHRSW)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Piping	Pressure boundary	Carbon steel	Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity
		Stainless steel	Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity
Tubing	Pressure boundary	Copper alloy< 15% zn	Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity
		Stainless steel	Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity
Valve body	Pressure boundary	Carbon steel	Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity
		Stainless steel	Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity

3.1.54 Equipment Retired in Place (RIP)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – indoor (int)	Loss of material	One-time inspection
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Air – indoor (int)	Loss of material	One-time inspection

3.1.56 Reactor Water Clean-Up (RWCU)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Filter housing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water > 270°f (int)	Cracking	Water chemistry control – BWR
				Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR
Heat exchanger (shell)	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water > 270°f (int)	Cracking	Water chemistry control – BWR
				Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR

3.1.56 Reactor Water Clean-Up (RWCU) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Orifice	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water > 270°f (int)	Cracking	Water chemistry control – BWR
				Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR
Piping	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water > 270°f (int)	Cracking	Water chemistry control – BWR
				Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR
Pump casing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water > 270°f (int)	Cracking	Water chemistry control – BWR
				Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR

3.1.56 Reactor Water Clean-Up (RWCU) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Strainer housing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water > 270°f (int)	Cracking	Water chemistry control – BWR
				Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR
Tank	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water > 270°f (int)	Cracking	Water chemistry control – BWR
				Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR

3.1.56 Reactor Water Clean-Up (RWCU) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Tubing	Pressure boundary	Copper alloy< 15% zn	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water > 270°f (int)	Cracking	Water chemistry control – BWR
				Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water > 270°f (int)	Cracking	Water chemistry control – BWR
				Cracking – fatigue	Metal fatigue TLAA
				Loss of material	Water chemistry control – BWR

3.1.58 Standby Fuel Pool Cooling (SBFPC)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Piping	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Raw water (int)	Loss of material	Service water integrity
Tubing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Raw water (int)	Loss of material	Service water integrity
Valve body	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Raw water (int)	Loss of material	Service water integrity

3.1.59 Standby Gas Treatment (SBGT)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity
Sight glass	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity
		Glass	Air – indoor (ext)	None	None
			Raw water (int)	None	None
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity

3.1.60 Stator Cooling (SC)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Cooler	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – auxiliary systems
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – auxiliary systems
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – auxiliary systems

3.1.62 Standby Liquid Control (SLC)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Orifice	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Sodium pentaborate solution (int)	Loss of material	Water chemistry control – BWR
Piping	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Sodium pentaborate solution (int)	Loss of material	Water chemistry control – BWR
Pump casing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Sodium pentaborate solution (int)	Loss of material	Water chemistry control – BWR
Sight glass	Pressure boundary	Glass	Air – indoor (ext)	None	None
			Sodium pentaborate solution (int)	None	None
		Stainless steel	Air – indoor (ext)	None	None
			Sodium pentaborate solution (int)	Loss of material	Water chemistry control – BWR

3.1.62 Standby Liquid Control (SLC) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Strainer housing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Sodium pentaborate solution (int)	Loss of material	Water chemistry control – BWR
Tank	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Sodium pentaborate solution (int)	Loss of material	Water chemistry control – BWR
Tubing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Sodium pentaborate solution (int)	Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Sodium pentaborate solution (int)	Loss of material	Water chemistry control – BWR

3.1.64 Sampling System (SPL)

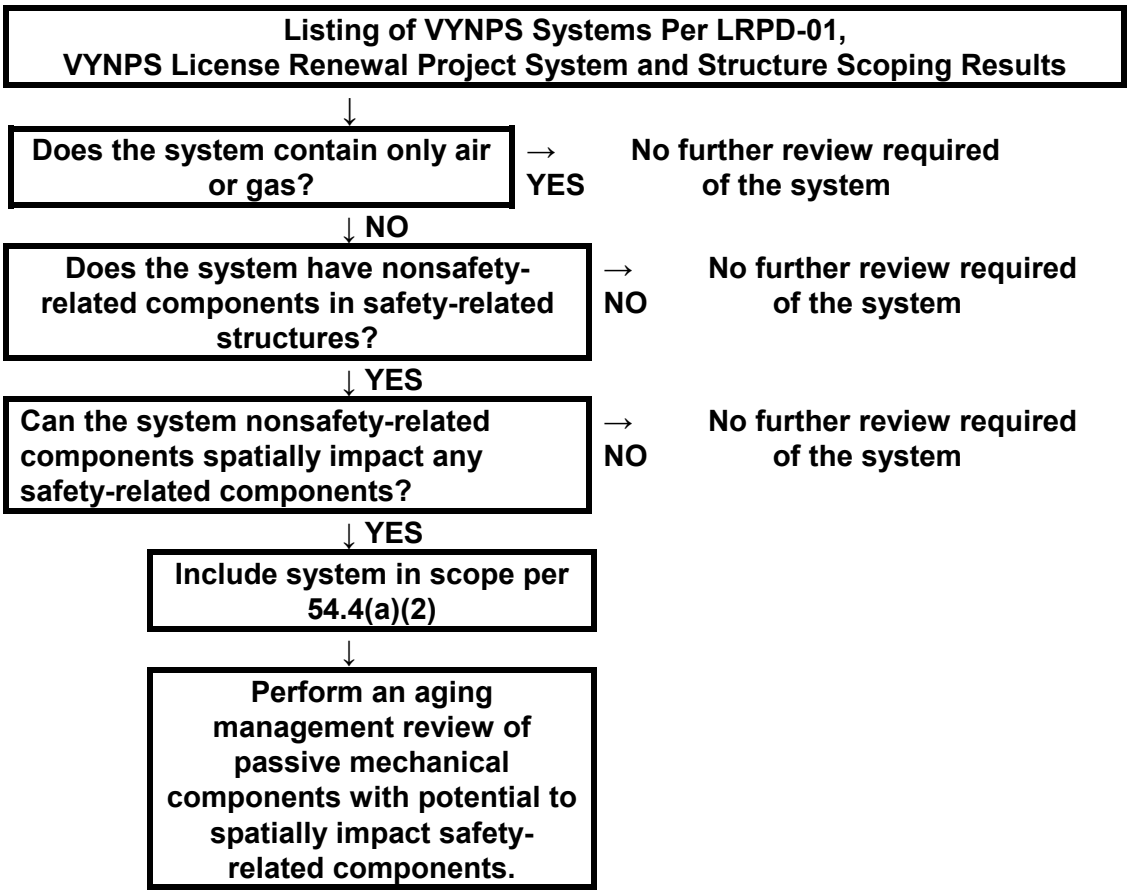
Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Piping	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Tubing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Treated water (int)	Loss of material	Water chemistry control – BWR
		Stainless steel	Air – indoor (ext)	None	None
			Treated water (int)	Loss of material	Water chemistry control – BWR

3.1.66 Service Water (SW)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Bolting	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
		Stainless steel	Air – indoor (ext)	None	None
Piping	Pressure boundary	Carbon steel	Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity
		Stainless steel	Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity
Pump casing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity
Strainer housing	Pressure boundary	Carbon steel	Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity
Tubing	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None
			Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity

3.1.66 Service Water (SW) (continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs
Valve body	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System walkdown
			Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity
		Stainless steel	Air – indoor (ext)	None	None
			Condensation (ext)	Loss of material	System walkdown
			Raw water (int)	Loss of material	Service water integrity


Listing of VYNPS Systems Per LRPD-01, VYNPS License Renewal Project System and Structure Scoping Results
Does the system contain only air or gas?
YES
No further review required of the system
NO
Does the system have nonsafety-related components in safety-related structures?
NO
No further review required of the system
YES
Can the system nonsafety-related components spatially impact any safety-related components?
NO
No further review required of the system
YES
Include system in scope per 54.4(a)(2)
Perform an aging management review of passive mechanical components with potential to spatially impact safety-related components.

Introduction – Review for Structural Interaction

Nonsafety-related SSCs directly connected to safety-related SSCs (typically piping) are subject to aging management review for 10 CFR 54.4(a)(2). (In this case, the scope of license renewal includes the nonsafety-related piping and supports up to and including the "first seismic or equivalent anchor" beyond the safety/nonsafety interface such that the safety-related portion of the piping will be able to perform its intended function. Some components in this group are considered safety-class at VYNPS.) For piping in this structural boundary, pressure integrity is not required; however, piping within the safety class pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. For VYNPS, the "structural boundary" is defined as the portion of a piping system outside the safety class pressure boundary, yet relied upon to provide structural support for the pressure boundary. The structural boundary is often shown on piping isometric drawings and is considered synonymous with the first seismic or equivalent anchor. **(Ref. 47)**

Approach

VYNPS mechanical system safety-related to nonsafety-related interfaces were reviewed from the safety-related/nonsafety-related interface to the first "seismic or equivalent anchor" or structural boundary.

Each of the LRA drawings, along with other flow diagrams, was reviewed to identify safety/nonsafety interfaces. Nonsafety-related piping systems connected to safety-related systems were traced back to the structural boundary or to a point that includes an adequate portion of the nonsafety-related piping run to conservatively include the first seismic or equivalent anchor. An equivalent anchor is a combination of hardware or structures that together are equivalent to a seismic anchor. A seismic anchor is defined as hardware or structures that, as required by the analysis, physically restrain forces and moments in three orthogonal directions. The physical arrangement as analyzed insures that the stresses that are developed in the safety-related piping and supports are within the applicable piping and structural code acceptance limits. If isometric drawings were not readily available to identify the structural boundary, connected lines were traced back to a point beyond the safety/nonsafety interface such as a base-mounted component, flexible connection, or the end of a piping run (such as a drain line). This is consistent with the guidance in NEI 95-10, Appendix F.

All components required or conservatively considered to provide structural support for safety-related portions of systems are included in Attachment 2. **(Ref. 49, 50, 51, 52, 53, 54, 55, 59)**

Special Note for Two Cases

The following nonsafety-related systems highlighted on LRA drawings do not have a structural nonsafety/safety interface at the license renewal boundary flags since the system is nonsafety-related:

1. Main Condenser and MSIV Leakage Pathway, AMRM-26 (LRA-33600-A00217, LRA-G-191156, and LRA-G-191164)
2. Fire Protection, AMRM-17 and AMRM-18 (LRA-G-191163 sh.1, LRA-G-19163 sh.2, LRA-G-191163 sh.3, and LRA-G-191163 sh.4)

Although the fire protection system (FP) has no nonsafety/safety interface at the license renewal boundary flags, some mechanical FP components do provide structural support for the safety-related service water (SW) system. The mechanical components that provide structural support for the SW system are reviewed in AMRM-17. **(Ref. 39)**

Summary of Results for Structural Interaction

The following systems (system codes as identified in EMPAC) include components that were found to be within the structural boundary or up to and including the first equivalent anchor. All components required or conservatively considered to provide structural support for safety-related portions of systems are included in Attachment 2.

- C (Condensate)
- CAD (Containment Air Dilution)
- CD (Condensate Demineralizer)
- CRD (Control Rod Drive)
- CS (Core Spray)
- CST (Condensate Storage and Transfer)
- DG (Diesel Generator & Auxiliaries)
- DLO (Diesel Lube Oil)
- DW (Demineralized Water)
- FO (Fuel Oil)
- FP (Fire Protection)
- FPC (Fuel Pool Cooling)
- HB (House Heating Boiler)
- HPCI (High Pressure Coolant Injection)
- HVAC (Heating Ventilation and Air Conditioning)
- IA (Instrument Air)
- MGLO (MG Lube Oil)
- N2 (Nitrogen Supply)
- NB (Nuclear Boiler)

- NM (Neutron Monitoring)
- PASS (Post Accident Sampling)
- PCAC (Primary Containment Atmosphere Control)
- RBCCW (Reactor Building Closed Cooling Water)
- RCIC (Reactor Core Isolation Cooling)
- RDW (Radwaste Liquid & Solid)
- RHR (Residual Heat Removal)
- RHRSW (RHR Service Water)
- RIP (Equipment Retired in Place)
- RWCU (Reactor Water Clean-Up)
- SBFPC (Standby Fuel Pool Cooling)
- SBGT (Standby Gas Treatment)
- SC (Stator Cooling)
- SLC (Standby Liquid Control)
- SPL (Sampling System)
- SW (Service Water)

Relative to Section 3.1.8 (AS system)

-----Original Message-----
From: Rainey, Paul
Sent: Thursday, December 23, 2004 12:32 PM
To: TAYLOR, ANDREW C
Cc: Lach, David J; Hoffman, John; Graboski, Joseph E
Subject: AMRM 30 open items

OI 5: V62-34 is not located in the control room. The valve is physically located in the SJAE room in the turbine building. Valve FCV-101-34, which is required for the Main Condenser and MSIV leakage pathway is also in the SJAE room as shown on dwg G-191182 at grid M/4. This valve can be operated from CRP 9-23. DWG 5920-5499 shows this valve's body material as ASTM A217-C5. I'm not sure why V62-34 is required for LR. VY needs to review OP-2113 for numbering consistency.

Relative to Section 3.1.9 (BLD system)

-----Original Message-----
From: Vekasy, Steve
Sent: Tuesday, October 18, 2005 8:29 AM
To: Hoffman, John
Cc: Lach, David J
Subject: RE: Parts of VY Sewage System in LR Scope due to a(2)

The original plant design had a bathroom on the hot side in the maintenance shop, but we expanded the shop and got rid of it decades ago. The piping got demolished and pulled back to the bathrooms on the non-rad side office area outside the maintenance shop. There are no bathrooms anywhere in the RCA, including the rx and turb bldgs. I don't know of any waste piping running through the RCA. It all runs from the bathrooms in the office areas directly outside below grade. There are no waste lines in the rx and turb bldg RCA. Technically speaking, we consider the maintenance dept office areas just outside the shop (where there are bathrooms) to be in the New Warehouse. There are potable water lines running from the back fan room through the turb bldg to the bathrooms in the maintenance office area. There are no connections to take potable water off this piping in the turb bldg (it just transits the area). I know of no 2 over 1 considerations for this pipe.

Stephen A. Vekasy, P.E.
Senior System Engineer
Vermont Yankee Nuclear Power Corp.
(W) 802-451-3052
(FAX) 802-451-3135
svekasy@entergy.com

Relative to Section 3.1.43 (NB system)

-----Original Message-----
From: Rainey, Paul
Sent: Thursday, October 14, 2004 2:59 PM
To: TAYLOR, ANDREW C; FINNIN Ron; Lach, David J; Hoffman, John
Cc: JACKS, JULIE DAIGH; Underkoffler, Ted; Vibert, Roger; Rogers, James; Lukens, Larry; Metell, Mike; Penniman, Bill; Fitzpatrick, Jim
Subject: RE: NB orifices - possible (a)(2)

1. RO-2-3-7A/B and 8A/B are shown on G-191159 Sh. 5 at grid G and 3/4. These ROs are in the recirculation pump seal cavity instrument lines.

2. Although the other ROs are listed in EMPAC, I don't believe any of the other listed orifices were ever installed. The ROs (except ROs 2-76A-H)were originally listed in the Valve & Specialty list (Dwgs A-191137 Part 2) and may even have been purchased via PO NY-706116 which is the original piping PO. The ROs were spec'd for 1/4" diameter, pipe schedule 160 and were rated for 1250 psia and 575 degrees F.

3. The RO numbers in the instrument lines penetrating containment are the same as the excess flow check valves in the corresponding lines except where an RO is upstream of more than 1 penetration. I believe the following is true,refer to G-191267 Sh.1.

Excess flow check valve (EFCV) SL-2-3-17A/B and SL-2-3-15A/B are downstream of RO-2-3-15A/B. Therefore RO-2-3-17A/B were not installed.

Excess flow check valve (EFCV) SL-2-3-33 and SL-2-3-27 are downstream of RO-2-3-27. Therefore RO-2-3-33 was not installed.

Excess flow check valve (EFCV) SL-2-3-35 and SL-2-3-25 are downstream of RO-2-3-25. Therefore RO-2-3-35 was not installed.

3. Orifices RO-2-3-21A-D, 23A-D, and 31A-P were not installed in the jet pump instrument lines because the instrument lines already had a restriction equivalent to a 1/4" orifice. See UFSAR page 5.2-30 and UFSAR change no. 17/096.

4. I can't find any references to ROs 2-3-76A-H or EFCVs with corresponding numbers. These ROs were not listed in the Valve and Specialty list. There are no EFCVs with similar numbers in the App J or IST programs.

Relative to Section 3.1.43 (NB system)

-----Original Message-----
From: Lach, David J
Sent: Monday, November 21, 2005 9:10 AM
To: Hoffman, John
Cc: TAYLOR, ANDREW C
Subject: RE: Dave - RO Orifices are now ID'd as "OBSOLETE" in E-MPAC. Thanks Bill P.

Thank You, John!!

Andy. I believe this will now allow you to close out the OI on these orifices since EMPAC has been updated.

Thanks,

Dave

From: Hoffman, John
Sent: Monday, November 21, 2005 8:55 AM
To: Lach, David J
Cc: Penniman, Bill
Subject: Dave - RO Orifices are now ID'd as "OBSOLETE" in E-MPAC. Thanks Bill P.

John R. Hoffman, P.E.
Vermont Yankee Nuclear Power Station
Manager, Engineering Projects
802-451-3095 (Desk)
802-451-3030 (Fax)

Relative to Section 3.1.54 (RIP system)

-----Original Message-----
From: Rainey, Paul [mailto:PRAIN90@entergy.com]
Sent: Thursday, September 22, 2005 12:58 PM
To: TAYLOR, ANDREW C; Lach, David J
Cc: Hoffman, John; Penniman, Bill; IVY, TED S
Subject: RE: RIP components with possible spatial impact

1. P-200-1B, I performed a walk down of all three cooling tower spray pond blow down pumps. These pumps are located just north of the west cooling tower. The pumps are remote from any required components associated with LR required components. Piping to the pumps has been removed and there is no potential water pressurization source. There is no credible potential for an (a) (2) flooding/spray spatial impact.

2. Valves V72-36A/B/C/D, these service air valves are shown on drawing G-191160 Sheet 6 at grid L/9-10.The air supply piping has been capped and the valves are closed and have a hose connection fitting. There is no potential water pressurization source. There is no credible potential for an (a) (2) flooding/spray spatial impact.

3. Valves V16-19-32A/B, 53, 54, 54A/B/C, these atmosphere control valves used to provide instrument air to the PCAC system before VY inerted the drywell. The instrument air supply is shown on drawing G-191160 Sheet 4 at grid I/6. The valves are shown on G-191175 Sheet 1 at grid J/12. The discharge piping is to the PCAC system which contains nitrogen or air when the drywell is open during RFOs. I performed a walk down of these valves which are located on the wall separating the CRD pump room from the torus toward the CRD pump motor end of the wall. There is no potential water pressurization source. There is no credible potential for an (a) (2) flooding/spray spatial impact.

4. P-37-1A/B, the RDW decontamination shop sump pumps are not located in the reactor building as shown on their EMPAC listing. The pumps are located in the turbine building as shown on drawing G-191144 at grid E/18 and drawing G-191146 at grid J/16. These pumps are located in the maintenance shop tool crib and are remote from any required components associated with LR required components. There is no credible potential for an (a) (2) flooding/spray spatial impact.

5. Valves V12-101, 102, 105, 106, 109, 110, 112, 116, and DCP-1, 2, 3, 4 and 5 are process side valves that were associated with the ECP system and they are located in the A RWCU pump room. The valves are shown on drawing G-191178 Sheet 1. DCP-1, 2, 3, 4 and 5 valves are isolated since the piping was cut and capped. The other valves are isolated from any potential pressurization sources other than the ECP test vessel since the piping was cut and capped. Valves V70-197A/B/C/D/E/F are RBCCW system valves (Drawing G-191159 Sheet 3 grid N/O-7) which provided cooling water to the ECP test vessel. Valves V70-197A/B are closed but still connected to the RBCCW system

piping. The RWCU pump rooms are contaminated and require a RWP for entry. It appears that the RBCCW system could potentially pressurize the ECP test vessel via leaking valves. Please advise as to what course of action is required to resolve this issue. I believe that the RWCU system containment isolation valves are located higher than this equipment.

Relative to Section 3.1.55 (RPI system)
-----Original Message-----
From: Jeffries, Daniel
Sent: Thu 10/27/2005 22:20
To: Hoffman, John
Subject: Refuel Platform Compressor

I don't see much of a risk of "spray" or "leakage" with the compressor system. The receiver is maintained between 80 and 140 psig by the compressors (lead – lag). Of course the air compressor system is attached to and rides along with the Platform. The compressor power supply is always opened by procedure when the operators leave the Platform unattended. The air line runs from the compressor up the side of the Platform's A-frame, along the top by hose to the where the orange take up reels are, and then by hose down the mast to the fuel grapple. We rarely experience any leaks – none that I can recall, actually.

Enclosed are photos to help illustrate.