TABLE OF CONTENTS

B1.0 INTRODUCTION

B1.1 OVERVIEW

License renewal aging management program (AMP) descriptions are provided in this appendix for each program credited for managing aging effects based upon the aging management review (AMR) results provided in Sections 3.1 through 3.6 of this application. The information in this appendix applies to both NMP1 and NMP2, unless otherwise specified.

Each AMP described in this section has ten elements which are consistent with the definitions in Section A.1, *Aging Management Review - Generic*, and Table A.1-1, "Elements of an Aging Management Program for License Renewal", of NUREG-1800 (Reference 1). The 10-element detail is only provided when the program is plant-specific. See Section B1.2 below.

B1.2 METHOD OF DISCUSSION

For those AMPs that are consistent with the assumptions made in Sections X and XI of NUREG-1801 (Reference 2), or are consistent with exceptions, each program discussion is presented in the following format:

- A Program Description abstract of the overall program form and function is provided.
- A NUREG-1801 Consistency statement is made about the program.
- Exceptions to the NUREG-1801 program are outlined and a justification is provided.
- Enhancements to ensure consistency with NUREG-1801 or additions to the NUREG-1801 program to manage aging for additional components with aging effects not assumed in NUREG-1801 for the NUREG-1801 program. A proposed schedule for completion is discussed.
- Operating Experience information specific to the program is provided.
- A Conclusion section provides a statement of reasonable assurance that the program is effective, or will be effective, once enhanced.

For those programs that are plant-specific, the above form is generally followed with the additional discussion of each of the ten elements.

B1.3 QUALITY ASSURANCE PROGRAM AND ADMINISTRATIVE CONTROLS

The Quality Assurance Program implements the requirements of 10 CFR 50, Appendix B (Reference 3), and is consistent with the summary in Appendix A.2 of NUREG-1800 (Reference 1). The Quality Assurance Program includes the elements of corrective action, confirmation process, and administrative controls, and is applicable to the safety-related and non-safety related systems, structures, and components (SSCs) that are subject to AMR. In many cases, existing activities were found adequate for managing aging effects during the period of extended operation. Generically the three elements are applicable as follows:

Corrective Actions

A single corrective actions process is applied regardless of the safety classification of the structure or component. Corrective actions are implemented through the initiation of a Deviation/Event Report (DER) in accordance with plant procedures established in response to 10 CFR 50, Appendix B. Site documents that implement aging management activities for license renewal will direct that a DER be prepared in accordance with those procedures whenever non-conforming conditions are found (i.e., the acceptance criteria are not met).

Equipment deficiencies are corrected through the initiation of a Work Order (WO) in accordance with plant procedures. Although equipment deficiencies may initially be documented by a WO, the corrective action process specifies that a DER also be initiated if required.

Confirmation Process

The focus of the confirmation process is on the follow-up actions that must be taken to verify effective implementation of corrective actions. The measure of effectiveness is in terms of correcting the adverse condition and precluding repetition of significant conditions adverse to quality. Plant procedures include provisions for timely evaluation of adverse conditions and implementation of any corrective actions required, including root cause determinations and prevention of recurrence where appropriate (e.g., significant conditions adverse to quality). These procedures provide for tracking, coordinating, monitoring, reviewing, verifying, validating, and approving corrective actions, to ensure effective corrective actions are taken. The DER process is also monitored for potentially adverse trends. The

existence of an adverse trend due to recurring or repetitive adverse conditions will result in the initiation of a DER. The aging management activities required for license renewal would also uncover any unsatisfactory condition due to ineffective corrective action.

Since the same 10 CFR 50, Appendix B corrective actions and confirmation processes are applied for nonconforming Safety Related (SR) and Non-Safety Related (NSR) structures and components subject to an AMR for license renewal, the corrective action program is consistent with the NUREG-1801 elements.

Administrative Controls

Administrative controls procedures provide information on procedures and other forms of administrative control documents, as well as guidance on classifying documents into the proper document type.

B1.4 OPERATING EXPERIENCE

Industry operating experience was incorporated into the license renewal process through a review of industry documents published after issuance of NUREG-1801 (Reference 2) to identify aging effects and mechanisms. Plant-specific operating experience (as documented through the plant's corrective action program) was reviewed to identify aging effects experienced. Additional interviews were conducted with AMP owners at NMPNS to collect and document evidence of operating experience.

Industry and plant-specific documents identified through the reviews described above were examined to determine if they involved aging effects pertinent to SSCs within the scope of license renewal (WSLR) at NMPNS. Pertinent operating experience documents were then categorized with respect to (1) the material and environment involved in the aging effect, (2) the AMP that manages the aging effect, and (3) the SSCs affected. If aging effects and mechanisms were identified that had not been identified previously as relevant for the material/environment combination of interest, AMR results were adjusted accordingly. If no existing program managed the identified aging effect, a new AMP was considered.

Each program summary in this appendix contains a discussion of operating experience relevant to the program, including past corrective actions resulting in program enhancements. This information provides objective evidence that the effects of aging have been, and will continue to be, adequately managed.

B1.5 AGING MANAGEMENT PROGRAMS

The following AMPs are described in Section B2.0 of this appendix as indicated. These programs apply to both NMP1 and NMP2 unless otherwise specified. The programs are either discussed in NUREG-1801 (Section XI) or are plant-specific. Plant-specific programs are listed at the end of the table in Section B2.0. Programs are identified as either existing or new.

1. 10 CFR 50 Appendix J Program (Section B2.1.26) [Existing]

2. ASME Section XI Inservice Inspection (Subsection IWE) Program (Section B2.1.23) [Existing]

3. ASME Section XI Inservice Inspection (Subsection IWF) Program (Section B2.1.25) [Existing]

4. ASME Section XI Inservice Inspection (Subsection IWL) Program (Unit 2 only) (Section B2.1.24) [Existing]

5. ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program (Section B2.1.1) [Existing]

6. Boraflex Monitoring Program (Section B2.1.12) [Existing]

7. Buried Piping and Tanks Inspection Program (Section B2.1.22) [New]

8. BWR Feedwater Nozzle Program (Section B2.1.5) [Existing]

9. BWR Penetrations Program (Section B2.1.7) [Existing]

10. BWR Reactor Water Cleanup System Program (Section B2.1.15) [Existing]

11. BWR Stress Corrosion Cracking Program (Section B2.1.6) [Existing]

12. BWR Vessel ID Attachment Welds Program (Section B2.1.4) [Existing]

13. BWR Vessel Internals Program (Section B2.1.8) [Existing]

14. Closed-Cycle Cooling Water System Program (Section B2.1.11) [Existing]

15. Compressed Air Monitoring Program (NMP1 only) (Section B2.1.14) [Existing]

16. Fire Protection Program (Section B2.1.16) [Existing]
17. Fire Water System Program (Section B2.1.17) [Existing]
18. Flow-Accelerated Corrosion Program (Section B2.1.9) [Existing]
19. Fuel Oil Chemistry Program (Section B2.1.18) [Existing]
20. Fuse Holder Inspection Program (Section B2.1.35) [New]
21. Inspection of Overhead Heavy Load and Light Load Handling Systems Program (Section B2.1.13) [Existing]
22. Masonry Wall Program (Section B2.1.27) [Existing]
23. Non-EQ Electrical Cables and Connections Program (Section B2.1.29) [New]
24. Non-EQ Electrical Cables Used in Instrumentation Circuits Program (Section B2.1.30) [Existing]
25. Non-EQ Inaccessible Medium Voltage Cables Program (Section B2.1.31) [New]
26. Non-Segregated Bus Inspection Program (Section B2.1.34) [New]
27. One-Time Inspection Program (Section B2.1.20) [New]
28. Open-Cycle Cooling Water System Program (Section B2.1.10) [Existing]
29. Preventive Maintenance Program (Section B2.1.32) [Existing]
30. Reactor Head Closure Studs Program (Section B2.1.3) [Existing]
31. Reactor Vessel Surveillance Program (Section B2.1.19) [Existing]
32. Selective Leaching of Materials Program (Section B2.1.21) [New]
33. Structures Monitoring Program (Section B2.1.28) [Existing]
34. Systems Walkdown Program (Section B2.1.33) [Existing]
35. Water Chemistry Control Program (Section B2.1.2) [Existing]

B1.6 TIME LIMITED AGING ANALYSES AGING MANAGEMENT PROGRAMS

The following Time Limited Aging Analyses AMPs are described in Section B3.0 of this appendix as indicated. These programs apply to both NMP1 and NMP2 unless otherwise specified. The programs are either discussed in NUREG-1801 (Section X) or are plant-specific. Plant-specific programs are listed at the end of the table in Section B3.0. Programs are identified as either existing or new.

1. Environmental Qualification Program (Section B3.1) [Existing]

2. Fatigue Monitoring Program (Section B3.2) [Existing]

3. Torus Corrosion Monitoring Program (NMP1 only) (Section B3.3) [Existing]

B2.0 AGING MANAGEMENT PROGRAMS

The correlation between NUREG-1801 (Section XI) programs and the NMPNS programs is shown below. For the NMPNS Programs, links to appropriate sections of this appendix are provided.

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	NINE MILE POINT PROGRAM
XI.M1	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program (Section B2.1.1)
XI.M2	Water Chemistry	Water Chemistry Control Program (Section B2.1.2)
XI.M3	Reactor Head Closure Studs	Reactor Head Closure Studs Program (Section B2.1.3)
XI.M4	BWR Vessel ID Attachment Welds	The BWR Vessel ID Attachment Welds Program is described in Section B2.1.4, and is implemented by the BWR Vessel Internals Program (Section B2.1.8).
XI.M5	BWR Feedwater Nozzle	BWR Feedwater Nozzle Program (Section B2.1.5)
XI.M6	BWR Control Rod Drive Return Line Nozzle	Not applicable. This program is not credited for aging management at NMPNS.
XI.M7	BWR Stress Corrosion Cracking	BWR Stress Corrosion Cracking Program (Section B2.1.6)
XI.M8	BWR Penetrations	The BWR Penetrations Program is described in Section B2.1.7, and is implemented by the BWR Vessel Internals Program (Section B2.1.8).

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	NINE MILE POINT PROGRAM
XI.M9	BWR Vessel Internals	BWR Vessel Internals Program (Section B2.1.8)
XI.M10	Boric Acid Corrosion	Not applicable. NMP1 and NMP2 are BWRs.
XI.M11	Nickel-Alloy Nozzles and Penetrations	Not applicable. NMP1 and NMP2 are BWRs.
XI.M12	Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)	Not applicable. Inservice Inspection Program requirements described in Section B2.1.1 are adequate for all potentially susceptible components at NMPNS.
XI.M13	Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS)	Not applicable. Potentially susceptible components at NMPNS are evaluated and inspected as part of the BWR Vessel Internals Program (Section B2.1.8).
XI.M14	Loose Part Monitoring	Not applicable. This program is not credited for aging management at NMPNS.
XI.M15	Neutron Noise Monitoring	Not applicable. NMP1 and NMP2 are BWRs.
XI.M16	PWR Vessel Internals	Not applicable. NMP1 and NMP2 are BWRs.
XI.M17	Flow-Accelerated Corrosion	Flow-Accelerated Corrosion Program (Section B2.1.9)
XI.M18	Bolting Integrity	Not applicable. Loss of material, cracking, and loss of preload in closure bolting are managed by different programs at NMPNS as indicated in Section 3.0 tables.
XI.M19	Steam Generator Tube Integrity	Not applicable. NMP1 and NMP2 are BWRs.

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	NINE MILE POINT PROGRAM
XI.M20	Open-Cycle Cooling Water System	Open-Cycle Cooling Water System Program (Section B2.1.10)
XI.M21	Closed-Cycle Cooling Water System	Closed-Cycle Cooling Water System Program (Section B2.1.11)
XI.M22	Boraflex Monitoring	Boraflex Monitoring Program (Section B2.1.12)
XI.M23	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems	Inspection of Overhead Heavy Load and Light Load Handling Systems Program (Section B2.1.13)
XI.M24	Compressed Air Monitoring	Compressed Air Monitoring Program (NMP1 only) (Section B2.1.14).
XI.M25	BWR Reactor Water Cleanup System	BWR Reactor Water Cleanup System Program (Section B2.1.15)
XI.M26	Fire Protection	Fire Protection Program (Section B2.1.16)
XI.M27	Fire Water System	Fire Water System Program (Section B2.1.17)
XI.M28	Buried Piping and Tanks Surveillance	Not applicable. This program is not credited for aging management at NMPNS. See XI.M34, Buried Piping and Tanks Inspection Program (Section B2.1.22)
XI.M29	Aboveground Carbon Steel Tanks	Not applicable. This program is not credited for aging management at NMPNS.
XI.M30	Fuel Oil Chemistry	Fuel Oil Chemistry Program (Section B2.1.18)
XI.M31	Reactor Vessel Surveillance	Reactor Vessel Surveillance Program (Section B2.1.19)

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	NINE MILE POINT PROGRAM
XI.M32	One-Time Inspection	One-Time Inspection Program (Section B2.1.20)
XI.M33	Selective Leaching of Materials	The Selective Leaching of Materials Program is described in Section B2.1.21, and is implemented by the One-Time Inspection Program (Section B2.1.20).
XI.M34	Buried Piping and Tanks Inspection	Buried Piping and Tanks Inspection Program (Section B2.1.22)
XI.S1	ASME Section XI, Subsection IWE	ASME Section XI Inservice Inspection (Subsection IWE) Program (Section B2.1.23)
XI.S2	ASME Section XI, Subsection IWL	ASME Section XI Inservice Inspection (Subsection IWL) Program (Unit 2 only) (Section B2.1.24)
XI.S3	ASME Section XI, Subsection IWF	ASME Section XI Inservice Inspection (Subsection IWF) Program (Section B2.1.25)
XI.S4	10 CFR Part 50, Appendix J	10 CFR 50 Appendix J Program (Section B2.1.26)
XI.S5	Masonry Wall Program	The Masonry Wall Program is described in Section B2.1.27, and is implemented by the Structures Monitoring Program (Section B2.1.28).
XI.S6	Structures Monitoring Program	Structures Monitoring Program (Section B2.1.28)

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	NINE MILE POINT PROGRAM
XI.S7	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants	Not applicable. This program is not credited for aging management since there are no water-control structures for emergency cooling operation or flood protection at NMPNS.
XI.S8	Protective Coating Monitoring and Maintenance Program	Not applicable. This program is not credited for aging management.
XI.E1	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Non-EQ Electrical Cables and Connections Program (Section B2.1.29)
XI.E2	Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits	Non-EQ Electrical Cables Used in Instrumentation Circuits Program (Section B2.1.30)
XI.E3	Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Non-EQ Inaccessible Medium Voltage Cables Program (Section B2.1.31)
N/A	Plant-Specific Program	Preventive Maintenance Program (Section B2.1.32)
N/A	Plant-Specific Program	Systems Walkdown Program (Section B2.1.33)
N/A	Plant-Specific Program	Non-Segregated Bus Inspection Program (Section B2.1.34)
N/A	Plant-Specific Program	Fuse Holder Inspection Program (Section B2.1.35)

B2.1 AGING MANAGEMENT PROGRAMS

B2.1.1 ASME SECTION XI INSERVICE INSPECTION (SUBSECTIONS IWB, IWC, IWD) PROGRAM

Program Description

The American Society of Mechanical Engineers (ASME) Section XI Inservice Inspection (ISI) (Subsections IWB, IWC, IWD) Program (referred to herein as the IWB/C/D ISI Program) is an existing program that manages aging of Class 1, 2, and 3 pressure-retaining components and their integral attachments. Program activities include periodic visual, surface, and/or volumetric examination and pressure tests of Class 1, 2, and 3 pressure-retaining components. The IWB/C/D ISI Program is based on the 1989 edition of the ASME Boiler and Pressure Vessel Code with no Addenda, Section XI (Subsections IWB, IWC, and IWD) for inservice inspection of pressure-retaining components and their integral attachments, with the risk-informed requirements of ASME Code Case N-578-1 implemented for examination of welds in Class 1 and 2 piping as approved by the NRC in plant-specific exemptions.

NUREG-1801 Consistency

The IWB/C/D ISI Program is an existing program that takes exception to certain NUREG-1801, Section XI.M1 (ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD) evaluation elements (Reference 2).

Exceptions to NUREG-1801

The program described in NUREG-1801, Section XI.M1, cites ASME Section XI requirements covered in the 1995 edition through the 1996 addenda. The IWB/C/D ISI programs for NMP1 and NMP2 are based on the 1989 edition with no addenda. This was found acceptable by the NRC in Safety Evaluation Reports (SERs) dated October 5, 2000 (Enclosure to Reference 24) and March 3, 2000 (Enclosure to Reference 25), respectively. Additionally, the IWB/C/D ISI programs for NMP1 and NMP2 implement risk-informed requirements of ASME Code Case N-578-1. This was found acceptable by the NRC in Safety Evaluation Reports (SERs) dated September 4, 2002 (Enclosure to Reference 41) and May 31, 2001 (Enclosure 1 to Reference 11), respectively.

Program Elements Affected

- **Detection of Aging Effects, Monitoring and Trending**

  Program activities are implemented through the IWB/C/D ISI program plans submitted to the NRC as identified in the SERs listed above.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the IWB/C/D ISI Program. Review of plant-specific operating experience revealed DERs documenting indications of cracking in recirculation components, piping, and various nozzle connection welds. Deficiencies identified by IWB/C/D ISI Program activities have been repaired, replaced, or evaluated as acceptable in accordance with ASME Section XI and station implementing procedures.

The plant continuously reviews industry operating experience to determine its applicability to NMPNS and adjusts inspection plans accordingly. Plant-specific operating experience is reviewed and trended; findings are documented, reviewed, and resolved; corrective actions are taken; and mitigative actions to limit aging initiated.

Conclusion

The IWB/C/D ISI Program has been effective in managing aging of Class 1, 2, and 3 pressure-retaining components and their integral attachments.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the IWB/C/D ISI Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.2 WATER CHEMISTRY CONTROL PROGRAM

Program Description

The Water Chemistry Control Program is an existing program that manages aging effects by controlling the internal environment of the reactor water, feedwater, condensate, and control rod drive systems, and related auxiliaries (such as the NMP1 torus, NMP2 suppression pool, condensate storage tank, and spent fuel pool). The aging effects/mechanisms of concern include (1) stress corrosion cracking; (2) loss of material due to corrosion; and (3) fouling. Program activities include monitoring and controlling concentrations of known detrimental chemical species below the levels known to cause degradation. The Water Chemistry Control Program implements the guidelines for BWR water chemistry presented in Electric Power Research Institute (EPRI) Reports TR-103515-R1 (Reference 4) and TR-103515-R2 (Reference 28).

The Water Chemistry Control Program credits activities performed under the direction of the One-Time Inspection Program (Section B2.1.20) to verify program effectiveness in areas of low flow or stagnant water.

NUREG-1801 Consistency

The Water Chemistry Control Program is an existing program that takes exception to certain NUREG-1801, Section XI.M2 (Water Chemistry) evaluation elements (Reference 2).

Exceptions to NUREG-1801

The program described in NUREG-1801, Section XI.M2, identifies the February 1994 version of BWRVIP-29 (EPRI TR-103515) as the basis for BWR water chemistry programs. EPRI periodically updates the water chemistry guidelines as new industry experience becomes available. Revised guidelines published in December 1996 and February 2000 were found acceptable by the NRC in SERs dated September 18, 1998 (Enclosure 2 to Reference 26) and September 13, 2002 (Section 3.0.3.2 in Enclosure to Reference 27), respectively.

Program Elements Affected

- **Scope, Parameters Monitored/Inspected**

  The Water Chemistry Control Program at NMPNS is based on EPRI TR-103515-R1 and EPRI TR-103515-R2, which were approved by the NRC in the SERs identified above.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Water Chemistry Control Program. As chemistry control guidelines were evolving in the industry, NMPNS experience with reactor water system chemistry was similar to that of the industry. Review of plant-specific operating experience revealed DERs documenting instances where monitored parameters exceeded specified action levels or goals. In those instances where a chemistry action level was exceeded, prompt corrective actions were taken to re-establish proper chemistry.

The Water Chemistry Control Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Water Chemistry Control Program has been effective in mitigating corrosion in systems and components at NMPNS through continued application of widely-used industry guidelines, which are updated as new information becomes available.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Water Chemistry Control Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.3 REACTOR HEAD CLOSURE STUDS PROGRAM

Program Description

The Reactor Head Closure Studs Program is an existing program that manages cracking of and loss of material from the reactor pressure vessel closure studs. The Reactor Head Closure Studs Program implements guidance provided in Regulatory Guide 1.65. Augmented examinations are performed through the ISI Program, which is based on the 1989 edition of the ASME Boiler and Pressure Vessel Code with no Addenda, as approved by the NRC in plant-specific exemptions (refer to Section B2.1.1).

NUREG-1801 Consistency

The Reactor Head Closure Studs Program takes exception to certain NUREG-1801, Section XI.M3 (Reactor Head Closure Studs) evaluation elements (Reference 2).

Exceptions to NUREG-1801

The program described in NUREG-1801, Section XI.M3, cites ASME Section XI requirements covered in the 1995 edition through the 1996 addenda. The IWB/C/D ISI programs for NMP1 and NMP2 are based on the 1989 edition with no addenda. This was found acceptable by the NRC in SERs dated October 5, 2000 (Enclosure to Reference 24) and March 3, 2000 (Enclosure to Reference 25), respectively.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Reactor Head Closure Studs Program. NMPNS reactor vessel studs have experienced very little degradation. A review of plant-specific operating experience revealed only a few DERs initiated as a result of inspections of the studs, associated nuts, and washers; these related to normal maintenance issues and did not identify age-related defects. There are no existing defects in the head studs or nuts.

Conclusion

The IWB/C/D ISI Program has been effective in managing aging of the reactor head closure studs.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the ISI Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.4 BWR VESSEL ID ATTACHMENT WELDS PROGRAM

Program Description

The BWR Vessel ID Attachment Welds Program is an existing program that manages the effects of cracking in reactor pressure vessel inside diameter attachment welds. The BWR Vessel ID Attachment Welds Program is based on industry guidelines issued by the BWR Vessel and Internals Project (BWRVIP) and approved by the NRC.

Implementation of the BWR Vessel ID Attachment Welds Program is discussed in the program description for the BWR Vessel Internals Program (Section B2.1.8).

The attributes of the BWR Vessel ID Attachment Welds Program related to maintaining reactor coolant water chemistry are discussed in the program description for the Water Chemistry Control Program (Section B2.1.2).

NUREG-1801 Consistency

The BWR Vessel ID Attachment Welds Program, as implemented by the programs listed above, is consistent with NUREG-1801, Section XI.M4 (BWR Vessel ID Attachment Welds) (Reference 2).

B2.1.5 BWR FEEDWATER NOZZLE PROGRAM

Program Description

The BWR Feedwater Nozzle Program is an existing program that manages cracking of critical regions of the BWR feedwater nozzle. Program activities are implemented as augmented examinations through the ISI Program, which is based on the 1989 edition of the ASME Boiler and Pressure Vessel Code with no Addenda, as approved by the NRC in plant-specific exemptions (refer to Section B2.1.1). For NMP1 only, the recommendations of General Electric (GE) NE-523-A71-0594 are applicable and certain system modifications have been made to mitigate nozzle cracking. The NMP2 feedwater nozzles were redesigned by GE prior to operation and are not susceptible to cracking. The program includes inspection of both the NMP1 and NMP2 feedwater nozzles per Table IWB 2500-1.

NUREG-1801 Consistency

The BWR Feedwater Nozzle Program is an existing program that takes exception to certain NUREG-1801, Section XI.M5 (BWR Feedwater Nozzle) evaluation elements (Reference 2).

Exceptions to NUREG-1801

The program described in NUREG-1801, Section XI.M5, cites ASME Section XI requirements covered in the 1995 edition through the 1996 addenda. The IWB/C/D ISI programs for NMP1 and NMP2 are based on the 1989 edition with no addenda. This was found acceptable by the NRC in SERs dated October 5, 2000 (Enclosure to Reference 24) and March 3, 2000 (Enclosure to Reference 25), respectively.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the BWR feedwater nozzles. Reviews of plant-specific operating experience revealed that no DERs have been written as a result of indications in the NMP1 feedwater nozzles. However, indications have been detected in the dissimilar metal weld associated with the NMP2 feedwater nozzles. A weld overlay process conforming to ASME Code Case N-504-1 was approved by the NRC (Reference 39) and implemented on one nozzle (Reference 35).

The plant continuously reviews industry operating experience to determine its applicability to NMPNS and adjusts inspection plans accordingly. Plant-specific operating experience is reviewed and trended; findings are documented, reviewed, and resolved; corrective actions are taken; and mitigative actions to limit aging initiated.

Conclusion

The IWB/C/D ISI Program has been effective in managing aging of the feedwater nozzles.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the ISI Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.6 BWR STRESS CORROSION CRACKING PROGRAM

Program Description

The BWR Stress Corrosion Cracking (SCC) Program is an existing program that mitigates intergranular SCC (IGSCC) in stainless steel reactor coolant pressure boundary components and piping four inches and greater nominal pipe size. The BWR Stress Corrosion Cracking Program is based on industry guidelines approved by the NRC. Augmented examinations are performed through the ISI Program, which is based on the 1989 edition of the ASME Boiler and Pressure Vessel Code with no Addenda, as approved by the NRC in plant-specific exemptions (refer to Section B2.1.1).

The attributes of the BWR SCC Program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program (Section B2.1.2).

NUREG-1801 Consistency

The BWR SCC Program takes exception to certain NUREG-1801, Section XI.M7 (BWR SCC) evaluation elements (Reference 2).

Exceptions to NUREG-1801

(1) The program described in NUREG-1801, Section XI.M7, cites ASME Section XI requirements covered in the 1995 edition through the 1996 addenda. The IWB/C/D ISI programs for NMP1 and NMP2 are based on the 1989 edition with no addenda. This was found acceptable by the NRC in SERs dated October 5, 2000 (Enclosure to Reference 24) and March 3, 2000 (Enclosure to Reference 25), respectively.

Program Elements Affected

- **Acceptance Criteria**

  Program activities are implemented through the IWB/C/D ISI program plans submitted to the NRC as identified in the SERs listed in (1), above.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to BWR stress corrosion cracking. Along with other plants in the BWR fleet, NMPNS has found indications of IGSCC in recirculation system piping and welds that were evaluated and dispositioned in accordance with the applicable ISI Program plan.

The plant continuously reviews industry operating experience to determine its applicability to NMPNS and adjusts inspection plans accordingly. Plant-specific operating experience is reviewed and trended; findings are documented, reviewed, and resolved; corrective actions are taken; and mitigative actions to limit aging initiated.

Conclusion

The IWB/C/D ISI Program has been effective in managing BWR stress corrosion cracking.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the ISI Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.7 BWR PENETRATIONS PROGRAM

Program Description

The BWR Penetrations Program is an existing program that manages the effects of cracking in the various penetrations of the reactor pressure vessels at NMPNS. The BWR Penetrations Program is based on guidelines issued by the BWR Vessel and Internals Project (BWRVIP) and approved by the NRC.

Implementation of the BWR Penetrations Program is discussed in the program description for the BWR Vessel Internals Program (Section B2.1.8).

The attributes of the BWR Penetrations Program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program (Section B2.1.2).

NUREG-1801 Consistency

The BWR Penetrations Program, as implemented by the programs listed above, is consistent with NUREG-1801, Section XI.M8 (BWR Penetrations) (Reference 2).

B2.1.8 BWR VESSEL INTERNALS PROGRAM

Program Description

The BWR Vessel Internals Program is an existing program that manages aging of materials inside the reactor vessel. Program activities include (1) inspections for the presence and effects of cracking; and (2) monitoring and control of water chemistry. The BWR Vessel Internals Program is based on guidelines issued by the BWR Vessel and Internals Project (BWRVIP) and approved (or pending approval[1]) by the NRC. NMPNS has implemented all relevant BWRVIP-required inspections as augmented examinations through the Inservice Inspection Program (refer to Section B2.1.1).

The attributes of the BWR Vessel Internals Program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program (Section B2.1.2)

NUREG-1801 Consistency

The BWR Vessel Internals Program is an existing program that is consistent with NUREG-1801, Section XI.M9 (BWR Vessel Internals) (Reference 2).

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the BWR Vessel Internals Program. Review of plant-specific operating experience revealed conditions discovered by BWR Vessel

[1] NRC review of BWRVIP-76 is not complete. When NRC review of BWRVIP-76 is complete, NMPNS will evaluate the NRC SER and complete SER Action Items, as appropriate.

Internals Program examinations similar to those identified elsewhere in the BWR fleet. In each case, indications were evaluated and either found acceptable for further service or appropriately repaired.

The BWR Vessel Internals Program is continually adjusted to account for industry experience and research (including activities of the BWRVIP and ASME Section XI Code Committees). In 2001, the Institute of Nuclear Power Operations (INPO) conducted a review of activities related to BWR Vessel Internals Program at NMP2. Several strengths were identified, and recommendations for improvement were addressed by program upgrades at NMP1 and NMP2. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The BWR Vessel Internals Program has been effective in managing aging effects, ensuring timely detection, evaluation, and appropriate corrective action to address degradation of reactor pressure vessel components and internals.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the BWR Vessel Internals Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.9 FLOW-ACCELERATED CORROSION PROGRAM

Program Description

The Flow-Accelerated Corrosion (FAC) Program (also referred to as the Erosion/Corrosion Program at NMPNS) is an existing program that manages aging effects due to flow-accelerated corrosion in carbon steel and low alloy steel piping containing single-phase and two-phase high-energy fluids. Program activities include (1) analysis using a predictive code (CHECWORKS) to determine critical locations, (2) baseline inspections to determine the extent of thinning at the selected locations, (3) follow-up inspections to confirm the predictions, and (4) repair or replacement of components, as necessary. The inspection results provide input to the predictive computer code to calculate the number of refueling or operating cycles remaining before the component reaches the minimum allowable wall thickness. If the component trend indicates that an area will reach the minimum allowed thickness before the next scheduled outage, the component is repaired, replaced, or re-evaluated. The program considers the recommended actions in NRC Bulletin 87-01 and Information Notice 91-18,

and implements the guidelines for an effective FAC program presented in EPRI Report NSAC-202L-R2 (Reference 5). The program also implements the recommendations provided in NRC Generic Letter (GL) 89-08, *Erosion/Corrosion Induced Pipe Wall Thinning*.

NUREG-1801 Consistency

The FAC Program is an existing program that is consistent with NUREG-1801, Section XI.M17 (Flow-Accelerated Corrosion) (Reference 2).

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

Wall thinning problems in single- and two-phase systems have occurred throughout the industry, as documented in various NRC Bulletins and Information Notices. NMPNS reviewed both industry and plant-specific operating experience in establishing the basis for the FAC Program, which is continually adjusted to account for further industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The FAC Program has been effective in managing the aging effects of flow-accelerated corrosion.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the FAC Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.10 OPEN-CYCLE COOLING WATER SYSTEM PROGRAM

Program Description

The Open-Cycle Cooling Water System (OCCWS) Program is an existing program that manages aging of components exposed to raw, untreated (e.g., service) water. Program activities include (a) surveillance and control of

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

NUREG-1801 Consistency

The OCCWS Program is an existing program that is consistent with NUREG-1801, Section XI.M20 (Open-Cycle Cooling Water System) (Reference 2).

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the OCCWS Program. Inspections implementing the guidance of GL 89-13 have identified deterioration (including pipe wall thinning, pinhole leakage, and microbiologically-influenced corrosion) and degradation (including clogged lines, flow restrictions, and fouling). These deficiencies were documented in DERs and resulted in cleaning, repair, or replacement of the affected components prior to loss of system function.

The OCCWS Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The OCCWS Program has been effective in managing aging effects, including erosion and corrosion, blockage due to silt buildup, microbiological growth, and zebra mussel growth, and leaks due to corrosion and microbiologically-influenced corrosion.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the OCCWS Program such that SSCs

WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.11 CLOSED-CYCLE COOLING WATER SYSTEM PROGRAM

Program Description

The Closed-Cycle Cooling Water System (CCCWS) Program is an existing program that manages loss of material and fouling of components exposed to closed-cycle cooling water environments. The applicable piping systems at NMPNS include the NMP1 and NMP2 Reactor Building Closed Loop Cooling Systems, NMP1 Control Room HVAC System, the NMP2 Control Building Chilled Water System, the heat exchanger jacket water cooling portions of the NMP1 Emergency Diesel Generator System and the NMP2 Standby Diesel Generator Protection (Generator) System and a portion of the NMP1 Turbine Building Closed Loop Cooling System. Program activities include chemistry monitoring, surveillance testing, and component inspections. The CCCWS Program implements the guidelines for controlling system performance and aging effects described in EPRI Report TR-107396 (Reference 6).

NUREG-1801 Consistency

The CCCWS Program is an existing program that takes exceptions to certain NUREG-1801, Section XI.M21 (Closed-Cycle Cooling Water System) evaluation elements (Reference 2), and requires enhancement to be consistent with others.

Exceptions to NUREG-1801

The program described in NUREG-1801, Section XI.M21, relies on maintenance of system corrosion inhibitor concentrations within specified limits to minimize corrosion. The jacket water cooling portion of the NMP1 Emergency Diesel Generator System utilizes a chromate water treatment regime based on vendor recommendations, and the jacket water cooling portion of the NMP2 Standby Diesel Generator Protection (Generator) System utilizes nitrite water chemistry. However, corrosion inhibitors are not part of the system chemistry for other portions of the CCCWS. Pure demineralized water chemistry is addressed by EPRI TR-107396 (Reference 6).

Program Elements Affected

- **Preventive Actions, Acceptance Criteria, and Corrective Actions**–

  Pure demineralized water chemistry is used in portions of the CCCWS as addressed by EPRI TR-107396 (Reference 6).

Enhancements

Enhancements to the CCCWS Program include revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Preventive Actions

- Include additional information on sampling frequencies for Control Room Chilled Water at NMP1.

- Expand periodic checks of NMP2 CCCW Systems consistent with the guidelines of EPRI TR-107396 (Reference 6).

Parameters Monitored/Inspected, Detection of Aging Effects

- Direct periodic inspections to monitor for loss of material and fouling in the Reactor Water Cleanup System heat exchangers at NMP1, Shutdown Cooling heat exchangers at NMP1, and for loss of material in Reactor Building Closed Loop Cooling system piping at NMP2.

- Implement a corrosion monitoring program for larger bore CCCW piping not subject to inspection under another program at NMP1.

Monitoring and Trending - Establish a five-year (minimum) frequency to inspect for degradation of components in NMP1 CCCW Systems and the NMP2 Control Building Chilled Water System.

Acceptance Criteria

- Provide the controls and sampling necessary to maintain water chemistry parameters in NMP2 CCCW Systems within the guidelines of EPRI Report TR-107396 (Reference 6).

- Specify chemistry control parameters for the NMP2 Control Building Chilled Water System.

Enhancements are scheduled for completion prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the CCCWS Program. Review of plant-specific operating experience revealed various forms of degradation that were discovered by CCCWS Program activities at NMPNS. Corrective actions for observed degradation included increased monitoring, component repair, or component replacement as deemed necessary. Periodic monitoring of CCCW Systems assures that any worsening trends are identified and the capabilities of CCCWS components WSLR are maintained.

The CCCWS Program at NMPNS is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The CCCWS Program has been effective in managing aging effects, including corrosion and fouling of heat transfer surfaces in CCCW Systems. Implementing the guidelines of EPRI Report TR-107396, as indicated above, will enhance program effectiveness.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the CCCWS Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.12 BORAFLEX MONITORING PROGRAM

Program Description

The Boraflex Monitoring Program is an existing program that manages degradation of neutron absorbing material in spent fuel pool storage racks

resulting from radiation exposure and possible water ingress. Program activities include (1) visual inspection of the NMP2 full-length test coupon to detect gap formation; (2) correlation of measured levels of silica in the spent fuel pool with analysis using a predictive code (e.g., RACKLIFE) to estimate boron loss from Boraflex panels; and (3) neutron attenuation testing to measure the boron areal density of the short-length test coupons. The Boraflex Monitoring Program is based on existing technology and methods for testing and evaluating material properties necessary to ensure the required 5% margin to criticality in the spent fuel pool is maintained.

NUREG-1801 Consistency

The Boraflex Monitoring Program is an existing program that takes exception to certain NUREG-1801, Section XI.M22 (Boraflex Monitoring) evaluation elements (Reference 2).

Exceptions to NUREG-1801

NMPNS takes exception to performing neutron attenuation testing and measurement of boron areal density of the spent fuel pool storage racks directly.

For NMP1, plans are currently being implemented to replace the existing Boraflex racks (except two) with racks made of Boral. For the remaining two racks, freshly discharged fuel is not placed in these racks and the design of the racks is such that the rate of degradation due to boron dissolution into the spent fuel pool water is negligible. This is indicated by very low levels of silica. Silica levels will continue to be monitored and, in conjunction with the RACKLIFE computer model, provides an accurate indication of the current and future condition of the spent fuel storage racks. In addition, short-length test coupons are periodically inspected and tested to monitor Boraflex panel condition. This includes neutron attenuation testing to measure the boron areal density.

For NMP2, the test coupons consist of both short and full-length versions. The coupon surveillance program consists of dimensional measurements, neutron attenuation testing (to measure the boron areal density) of the short length coupons; and visual inspections and dimensional measurements of the full length test coupon. Since these tests are performed on the short and full-length coupons, a more accurate indication of spent fuel storage rack physical condition is obtained. Silica testing is also performed, and in conjunction with the RACKLIFE computer model, provides an accurate indication of the current and future condition of the spent fuel storage racks.

Based upon the above, the current Boraflex Monitoring Program is sufficient to manage the aging of the spent fuel storage racks.

Program Elements Affected

- **Preventive Actions, Parameters Monitored, Detection of Aging Effects**

  In lieu of performing neutron attenuation testing and measuring boron areal density of the Boraflex panels, these tests are being performed on the test coupons for the NMP1 and NMP2 spent fuel storage racks.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Boraflex Monitoring Program. Plant-specific operating experience at NMPNS is related to testing of surveillance coupons, whose results indicate expected levels of degradation. Review of plant-specific operating experience revealed the following additional conditions that were discovered by Boraflex Monitoring Program activities in 2002:

- When the results of chemistry analysis indicated silica levels in the NMP1 spent fuel pool slightly greater than the established criteria for plant operation, a DER was initiated. A technical evaluation determined that actual silica levels were acceptable and the operating range was revised accordingly.

- A DER was initiated when predictive models (using RACKLIFE) indicated that degradation of Boraflex panels in worst-case locations would exceed the uniform panel losses assumed in the NMP2 spent fuel pool criticality analysis in 2010. The ensuing investigation determined that existing procedural controls were insufficient to prevent fuel loading in the limiting locations. The applicable fuel handling procedures were revised to assure appropriate consideration of program findings when planning fuel movement into the spent fuel racks employing Boraflex panels.

The Boraflex Monitoring Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Boraflex Monitoring Program has been effective in managing aging effects, including loss of boron carbide from Boraflex panels.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Boraflex Monitoring Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.13 INSPECTION OF OVERHEAD HEAVY LOAD AND LIGHT LOAD HANDLING SYSTEMS PROGRAM

Program Description

The Inspection of Overhead Heavy Load and Light Load Handling Systems Program (referred to herein as the Crane Inspection Program) is an existing program that manages loss of material due to corrosion of cranes WSLR. Program activities include (1) performance of various maintenance activities on a specified frequency; and (2) pre-operational inspections of equipment prior to lifting activities. Crane inspection activities are based on the mandatory requirements of applicable industry standards and implement the guidance of NUREG-0612 (Reference 15).

NUREG-1801 Consistency

The Crane Inspection Program is an existing program that will be consistent with NUREG-1801, Section XI.M23 (Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems) (Reference 2), after enhancements are incorporated.

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the Crane Inspection Program include revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Parameters Monitored/Inspected, Detection of Aging Effects - add specific direction for performance of pre-lift corrosion inspections of certain hoist lifting assembly components.

Enhancements are scheduled for completion prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Crane Inspection Program. Review of plant-specific operating experience revealed no failures caused by loss of material in crane structural components. The Crane Inspection Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Crane Inspection Program has been effective in managing corrosion of SSCs associated with load handling at NMPNS.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Crane Inspection Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.14 COMPRESSED AIR MONITORING PROGRAM (NMP1 ONLY)

Program Description

The Compressed Air Monitoring Program is an existing program that manages aging effects for portions of the Compressed Air Systems WSLR, including cracking and loss of material due to general corrosion, by controlling the internal environment of systems and components. Program activities include air quality checks at various locations to detect contaminants that would affect the system's intended function. Additional visual inspections are credited for identification and monitoring of degradation for air compressors, receivers, and air dryers. The Compressed Air Monitoring Program is based on GL 88-14 and recommendations presented in INPO Significant Operating Event Report 88-01.

The Compressed Air Monitoring Program is only applicable to NMP1 since the components requiring AMR for the NMP2 Compressed Air Systems are addressed by the 10 CFR 50 Appendix J Program.

NUREG-1801 Consistency

The Compressed Air Monitoring Program is an existing program that will be consistent with NUREG-1801, Section XI.M24 (Compressed Air Monitoring) (Reference 2), after enhancements are incorporated.

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the Compressed Air Monitoring Program include revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Scope, Preventive Action, Detection of Aging Effects - develop new activities to manage the loss of material, stress corrosion cracking, and perform periodic system leak checks. Expand the scope, periodicity, and inspection techniques to ensure that the aging of certain sub-components of the dryers and compressors (e.g., valves, heat exchangers) are managed.

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

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

Enhancements are scheduled for completion prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Compressed Air Monitoring Program. Since its inception in 1992, the Compressed Air Monitoring Program at NMPNS has effectively detected the buildup of corrosion products and prevented component failure. No pneumatic component WSLR has experienced a loss of intended function due to corrosion, corrosion product buildup, or dirt buildup in the instrument air system. The only noteworthy age related degradation found at NMP1 was stress corrosion cracking in unannealed red brass piping incorrectly installed in the system. This piping is being replaced.

The Compressed Air Monitoring Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Compressed Air Monitoring Program has been effective in preventing degraded air quality and the resultant general corrosion from affecting system performance.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Compressed Air Monitoring Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.15 BWR REACTOR WATER CLEANUP SYSTEM PROGRAM

Program Description

The BWR Reactor Water Cleanup System Program is an existing program that manages the effects of intergranular stress corrosion cracking on the intended function of austenitic stainless steel piping in the reactor water cleanup system. The BWR Reactor Water Cleanup System Program is based on industry guidelines approved by the NRC. Augmented examinations are performed through the ISI Program, which is based on the 1989 edition of the ASME Boiler and Pressure Vessel Code with no Addenda, as approved by the NRC in plant-specific exemptions (refer to Section B2.1.1).

The attributes of the BWR Reactor Water Cleanup System Program related to maintaining reactor coolant water chemistry are included in the Water Chemistry Control Program (Section B2.1.2)

NUREG-1801 Consistency

The BWR Reactor Water Cleanup System Program takes exception to certain NUREG-1801, Section XI.M25 (BWR Reactor Water Cleanup System) evaluation elements (Reference 2).

(1) The program described in NUREG-1801, Section XI.M25, cites ASME Section XI requirements covered in the 1995 edition through the 1996 addenda. The IWB/C/D ISI programs for NMP1 and NMP2 are based on the 1989 edition with no addenda. This was found acceptable by the NRC in SERs dated NRC in SERs dated October 5, 2000 (Enclosure to Reference 24) and March 3, 2000 (Enclosure to Reference 25), respectively.

Program Elements Affected

- **Acceptance Criteria**

  Program activities are implemented through the IWB/C/D ISI program plans submitted to the NRC as identified in the SERs listed in (1), above.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to cracking in the Reactor Water Cleanup System. Review of plant-specific operating experience revealed one DER documenting a leak and indications of IGSCC in a bimetallic piping weld. The identified deficiencies were evaluated and repaired in accordance with ASME Section XI and station implementing procedures.

The plant continuously reviews industry operating experience to determine its applicability to NMPNS and adjusts inspection plans accordingly. Plant-specific operating experience is reviewed and trended; findings are documented, reviewed, and resolved; corrective actions are taken; and mitigative actions to limit aging initiated.

Conclusion

The IWB/C/D ISI Program has been effective in managing RWCU System stress corrosion cracking.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the ISI Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.16 FIRE PROTECTION PROGRAM

Program Description

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

NUREG-1801 Consistency

The Fire Protection Program is an existing program that is consistent with NUREG-1801, Section XI.M26 (Fire Protection) (Reference 2).

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

NMPNS has evaluated applicable industry operating experience. Applicable guidelines and requirements have been incorporated into Fire Protection

Program implementing procedures. Minor degradation has been identified while performing Fire Protection Program activities (e.g., fire barrier penetration seals found damaged or cracked, fire dampers failed surveillance testing, and fire door inspections not satisfactory) and corrective actions taken. No significant age-related problems have been reported for NMPNS fire protection systems and components managed by the Fire Protection Program.

The Fire Protection Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Fire Protection Program has been effective in managing aging effects, including cracking, delamination, separation, and loss of materials used in fire barrier construction.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Fire Protection Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.17 FIRE WATER SYSTEM PROGRAM

Program Description

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

NUREG-1801 Consistency

The Fire Water System Program is an existing program that will be consistent with NUREG-1801, Section XI.M27 (Fire Water System) (Reference 2), after enhancements are incorporated.

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the Fire Water System Program include revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Scope - incorporate inspections to detect and manage loss of material due to corrosion into existing periodic test procedures.

Preventive Actions - specify periodic component inspections to verify that loss of material is being managed.

Parameters Monitored/Inspected - add procedural guidance for performing visual inspections to monitor internal corrosion and detect biofouling.

Detection of Aging Effects:

- Add requirements to periodically check the water-based fire protection systems for microbiological contamination.

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

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

Acceptance Criteria - define acceptance criteria for visual inspections and volumetric testing.

Enhancements are scheduled for completion prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Fire Water System Program. A review of the corrective action program shows that individual components have experienced various types of non-conformances (e.g., pinhole leaks, pipe wall thinning). Evaluations have demonstrated that no loss of system function would occur.

DERs have been initiated to document conditions discovered while performing Fire Water System Program activities. Internal system leakage and failed surveillance tests were often traced to fouling of valve seating surfaces with sand or silt. Typical resolutions included adding sections of piping to specific flushing procedures or periodic disassembly and cleaning of components.

The Fire Water System Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Fire Water System Program has been effective in maintaining system availability.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Fire Water System Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.18 FUEL OIL CHEMISTRY PROGRAM

Program Description

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

NUREG-1801 Consistency

The Fuel Oil Chemistry Program is an existing program that will be consistent with NUREG-1801, Section XI.M30 (Fuel Oil Chemistry) (Reference 2), after enhancements are incorporated.

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the Fuel Oil Chemistry Program include revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Scope:

- Add requirements to periodically check diesel fuel oil for microbiological organisms.
- Add requirements to periodically inspect fuel oil storage tanks for evidence of significant degradation, including a requirement that the wall thickness of tank bottom surfaces be determined.

Preventive Actions - provide guidelines for the appropriate use of biocides, corrosion inhibitors, and fuel stabilizers to maintain fuel oil quality at NMP1. Additionally, specify that water be removed from NMP1 tanks if found during routine sampling.

Parameters Monitored/Inspected - incorporate periodic tests for microbiological organisms.

Detection of Aging Effects:

- Include evaluation of microbiological organisms in fuel oil as a measure of contamination.
- Add a requirement for multilevel sampling.

Monitoring and Trending - establish a quarterly (minimum) frequency to check fuel oil for microbiological organisms, and a requirement for quarterly trending of analysis results.

Enhancements are scheduled for completion prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Fuel Oil Chemistry Program. Review of plant-specific operating experience revealed several incidents where contaminants (e.g., water, particulate) were detected through Fuel Oil Chemistry Program examinations. Corrective actions included contamination removal and system/component cleaning. However, there have been no instances of fuel oil system component failures at NMPNS attributed to contamination.

The Fuel Oil Chemistry Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Fuel Oil Chemistry Program has been effective in managing aging effects, including general, pitting, and crevice corrosion.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Fuel Oil Chemistry Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.19 REACTOR VESSEL SURVEILLANCE PROGRAM

Program Description

The Reactor Vessel Surveillance Program is an existing program that manages loss of fracture toughness due to neutron irradiation embrittlement in the Reactor Pressure Vessel (RPV) beltline material. Program activities include (1) periodic withdrawal and testing of surveillance capsules from each RPV; (2) use of test results and allowable stress loadings for the ferritic RPV materials to determine operating limits; and (3) comparison with a large industry data set to confirm validity of test results. Analysis and testing are based on the requirements of 10 CFR 50, Appendix H, and ASTM Standard E-185 (Reference 7).

NUREG-1801 Consistency

The Reactor Vessel Surveillance Program is an existing program that takes exception to certain NUREG-1801, Section XI.M31 (Reactor Vessel Surveillance) evaluation elements (Reference 2), and requires enhancement to be consistent with others.

Exceptions to NUREG-1801

The program described in NUREG-1801, Section XI.M31, indicates that tested specimens are placed in storage for future reconstitution use. NMP1 and NMP2 have committed to implement the BWRVIP Integrated Surveillance Program (ISP) described in BWRVIP-78 and BWRVIP-86 (Reference 30 and Reference 31, respectively), and intend to participate in the ISP through the period of extended operation. The BWRVIP ISP was found acceptable for the current license term by the NRC in an SER dated February 1, 2002 (Reference 32). Supplemental information to extend the BWRVIP ISP through the period of extended operation (based on the same technical criteria as found in BWRVIP-78 and BWRVIP-86) was incorporated into BWRVIP-116[2] (Reference 33). Since the proposed ISP for license renewal has no provision to store tested specimens, NMPNS considers such storage unnecessary.

Program Elements Affected

- **Item 4 of NUREG-1801 Program Description**

  NMP intends to participate in the ISP described in BWRVIP-116, which contains no requirement to retain tested specimens.

Enhancements

Enhancements to the Reactor Vessel Surveillance Program include revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

[2] NRC review of BWRVIP-116 is not complete. When NRC review of BWRVIP-116 is complete, NMPNS will evaluate the NRC SER and complete SER Action Items, as appropriate.

First paragraph of NUREG-1801 Program Description - incorporate the requirements and elements of the ISP, published by the BWRVIP, into the Reactor Vessel Surveillance Program.

Items 1 and 3 of NUREG-1801 Program Description - project analyses of upper shelf energy and pressure-temperature limits to 60 years using methods prescribed by Regulatory Guide 1.99, Revision 2, and include the applicable bounds of the data, such as operating temperature and neutron fluence.

Enhancements are scheduled for completion prior to the period of extended operation.

Operating Experience

NMPNS has successfully implemented a plant-specific Reactor Vessel Surveillance Program that is consistent with Regulatory Guide 1.99, Revision 2, 10 CFR 50, Appendix H, and ASTM Standard E-185. Three surveillance capsules that were originally installed in the NMP1 RPV have been removed and tested with satisfactory results. One of the three surveillance capsules that were originally installed in the NMP2 RPV has been removed and tested. Data from LaSalle Unit 1, LaSalle Unit 2, and Columbia Generating Station have been used to supplement the NMP2 surveillance data.

Under the ISP, neither NMP1 nor NMP2 is identified as a host plant; the representative materials for the limiting RPV plate and weld materials, and their associated withdrawal schedules, are identified in BWRVIP-116. Thus, future withdrawal and testing of the NMP1 and NMP2 surveillance capsules will be permanently deferred.

Through participation in the BWRVIP ISP, the NMPNS Reactor Vessel Surveillance Program will be adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Reactor Vessel Surveillance Program has been effective in managing loss of fracture toughness in RPV beltline materials.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Reactor Vessel Surveillance Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.20 ONE-TIME INSPECTION PROGRAM

Program Description

The One-Time Inspection Program is a new program that manages aging effects with potentially long incubation periods for susceptible components WSLR. Program activities include visual, volumetric, and other established inspection techniques consistent with industry practice to provide a means of verifying that an aging effect is either (1) not occurring, or (2) progressing so slowly that it has a negligible effect on the intended function of the structure or component. The program also provides measures for verifying the effectiveness of existing AMPs. If a one-time inspection reveals an aging effect requiring management, an evaluation is required to determine the ability of the affected component to perform its intended function(s) during the period of extended operation and any appropriate corrective action.

For stagnant or low flow areas in treated-water systems, the One-Time Inspection Program will determine the effectiveness of the Water Chemistry Control Program (Section B2.1.2) in managing the effects of aging. A representative sample will be selected from structures and components grouped on the basis of common characteristics such as materials of construction, fabrication process, operating environment, or aging effects. The sample size will be selected such that it encompasses the most susceptible components. Similar considerations will be used to select inspection samples; (1) for components that have an aging effect requiring management that is not expected to occur; or (2) for components where the aging effect is occurring very slowly.

For Class 1 piping less than four inches in diameter (nominal pipe size) that is directly connected to the reactor coolant pressure boundary, the One-Time Inspection Program will determine if cracking is occurring. Selection of components for inspection will be based on factors such as piping geometry, piping size, and flow conditions. Inspections will use existing non-destructive evaluation practices. If a flaw is detected, appropriate additional examinations will be performed using methods currently employed for similar components within the scope of the ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program (Section B2.1.1).

Selective leaching is also an appropriate candidate for the One-Time Inspection Program. It is an aging effect that occurs very slowly, and NMPNS has identified potentially susceptible components in various systems. The population of potentially affected components will be randomly sampled for inspection to confirm the absence of this aging effect. Inspection techniques may include a one-time visual inspection and hardness measurement.

NUREG-1801 Consistency

The One-Time Inspection Program is a new program that will be implemented prior to the period of extended operation in a manner consistent with NUREG-1801, Section XI.M32 (One-Time Inspection) (Reference 2).

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The One-Time Inspection Program is a new program at NMPNS; therefore, no programmatic operating experience is available. As operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

There is reasonable assurance that aging effects will be managed by the implementation of the One-Time Inspection Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.21 SELECTIVE LEACHING OF MATERIALS PROGRAM

Program Description

The Selective Leaching of Materials Program is a new program that manages aging of components susceptible to selective leaching. The potentially susceptible components include valve bodies, valve bonnets, pump casings, and heat exchanger components in various systems.

Implementation of the Selective Leaching of Materials Program is discussed in the program description for the One-Time Inspection Program (Section B2.1.20).

NUREG-1801 Consistency

The Selective Leaching of Materials Program, as implemented by the program listed above, will be consistent with NUREG-1801, Section XI.M33 (Selective Leaching of Materials) (Reference 2).

B2.1.22 BURIED PIPING AND TANKS INSPECTION PROGRAM

Program Description

The Buried Piping and Tanks Inspection Program is a new program that will manage the aging effects on the external surfaces of carbon steel, low-alloy steel, and cast iron components (e.g. tanks, piping) that are buried in soil. Program activities will include visual inspections of external coatings and wrappings to detect damage and degradation. Periodicity of inspections will be based on plant operating experience and opportunities for inspection due to maintenance.

NUREG-1801 Consistency

The Buried Piping and Tanks Inspection Program is a new program that will be implemented prior to the period of extended operation in a manner consistent with NUREG-1801, Section XI.M34 (Buried Piping and Tanks Inspection) (Reference 2).

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Buried Piping and Tanks Inspection Program is a new program at NMPNS; therefore, no programmatic operating experience is available. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

There is reasonable assurance that aging effects will be managed by the implementation of the Buried Piping and Tanks Inspection Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.23 ASME SECTION XI INSERVICE INSPECTION (SUBSECTION IWE) PROGRAM

Program Description

The ASME Section XI Inservice Inspection (Subsection IWE) Program (referred to herein as the IWE ISI Program) is an existing program that manages aging effects due to (1) corrosion of carbon steel components comprising the NMP1 and NMP2 containment pressure boundaries; and (2) degradation of NMP1 containment pressure-retaining polymers. Program activities include visual examination, with limited surface or volumetric examinations when augmented examination is required. The IWE ISI Program is based on the 1998 edition of the ASME Boiler and Pressure Vessel Code, Section XI (Subsection IWE) for containment inservice inspection with plant-specific exceptions approved by the NRC.

NUREG-1801 Consistency

The IWE ISI Program is an existing program that takes exception to certain NUREG-1801, Section XI.S1 (ASME Section XI, Subsection IWE) evaluation elements (Reference 2).

Exceptions to NUREG-1801

The evaluation in NUREG-1801, Section XI.S1, covers ASME Section XI requirements from both the 1992 edition with the 1992 addenda and the 1995 edition with the 1996 addenda. The IWE ISI programs for NMP1 and NMP2 are based on the 1998 edition. This was found acceptable by the NRC in an SER dated August 17, 2000 (Reference 29).

Program Elements Affected

- Parameters Monitored or Inspected, Detection of Aging Effects, Monitoring and Trending, Acceptance Criteria

Program activities are implemented through the IWE ISI Program submitted to the NRC as identified in the SER listed above.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the IWE ISI Program. Review of plant-specific operating experience revealed few noteworthy discrepancies and no age-related equipment failures. Deficiencies discovered by recent IWE ISI Program examinations included damage to the NMP1 torus equipment hatch, damage to the NMP1 drywell dome manway hatch sealing surface, minor corrosion on the NMP1 drywell dome sealing surface, and minor corrosion on the NMP2 drywell liner. These indications were investigated and corrected as reported in Reference 34 (for NMP1) and Reference 35 (for NMP2).

The plant continuously reviews industry operating experience to determine its applicability to NMPNS and adjusts inspection plans accordingly. Plant-specific operating experience is reviewed and trended; findings are documented, reviewed, and resolved; corrective actions are taken; and mitigative actions to limit aging initiated.

Conclusion

The IWE ISI Program has been effective in managing loss of material and changes in material properties for the NMPNS containment structures.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the IWE ISI Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.24 ASME SECTION XI INSERVICE INSPECTION (SUBSECTION IWL) PROGRAM [UNIT 2 ONLY]

Program Description

The ASME Section XI Inservice Inspection (Subsection IWL) Program (referred to herein as the IWL ISI Program) is an existing program that manages aging of concrete in the NMP2 containment wall, base mat, and drywell floor. Program activities include general visual examination of all accessible concrete surface areas, with provisions for detailed visual examination when deterioration and distress of suspect areas is detected. The IWL ISI Program is based on the 1998 edition of the ASME Boiler and Pressure Vessel Code, Section XI (Subsection IWL) for containment inservice inspection with plant-specific exceptions approved by the NRC. (Note: this program applies to concrete elements of BWR Mark II and III Containment structures. NMP1 is BWR Mark I Containment. Therefore, this program does not apply to NMP1).

NUREG-1801 Consistency

The IWE ISI Program is an existing program that takes exception to certain NUREG-1801, Section XI.S2 (ASME Section XI, Subsection IWL) evaluation elements (Reference 2).

Exceptions to NUREG-1801

The evaluation in NUREG-1801, Section XI.S2, covers ASME Section XI requirements from both the 1992 edition with the 1992 addenda and the 1995 edition with the 1996 addenda. The IWL ISI Program for NMP2 is based on the 1998 edition. This was found acceptable by the NRC in an SER dated August 17, 2000 (Reference 29).

Program Elements Affected

- Parameters Monitored or Inspected, Detection of Aging Effects, Monitoring and Trending, Acceptance Criteria

Program activities are implemented through the IWL ISI Program submitted to the NRC as identified in the SER listed above.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the IWL ISI Program. Review of plant-specific operating experience revealed no DERs written as a result of IWL ISI Program inspections since program inception.

The plant continuously reviews industry operating experience to determine its applicability to NMPNS and adjusts inspection plans accordingly. Plant-specific operating experience is reviewed and trended; findings are documented, reviewed, and resolved; corrective actions are taken; and mitigative actions to limit aging initiated.

Conclusion

The IWL ISI Program has been effective in managing loss of material and changes in material properties for the NMP2 containment structure.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the IWL ISI Program such that SSCs

WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.25 ASME SECTION XI INSERVICE INSPECTION (SUBSECTION IWF) PROGRAM

Program Description

The ASME Section XI Inservice Inspection (Subsection IWF) Program (referred to herein as the IWF ISI Program) is an existing program that manages aging of carbon steel component and piping supports due to general corrosion and wear. Program activities include visual examination to determine the general mechanical and structural condition of components and their supports. The IWF ISI Program is based on the 1989 edition of the ASME Boiler and Pressure Vessel Code, Section XI (Subsection IWF) for inservice inspection of supports and implements the alternate examination requirements of ASME Code Case N-491-1.

NUREG-1801 Consistency

The IWF ISI Program is an existing program that takes exception to certain NUREG-1801, Section XI.S3 (ASME Section XI, Subsection IWF) evaluation elements (Reference 2).

Exceptions to NUREG-1801

The evaluation in NUREG-1801, Section XI.S3, covers ASME Section XI requirements from the 1989 edition through the 1995 edition and addenda through the 1996 addenda. The IWF ISI programs for NMP1 and NMP2 are based on the 1989 edition with no addenda. This was found acceptable by the NRC in SERs dated October 5, 2000 (Enclosure to Reference 24) and March 3, 2000 (Enclosure to Reference 25), respectively. Additionally, the IWF ISI programs implement the alternate examination requirements of ASME Code Case N-491-1 as approved for use in Regulatory Guide 1.147 (Reference 40).

Program Elements Affected

- **Scope, Parameters Monitored/Inspected, Acceptance Criteria**

  Program activities are implemented through the IWF ISI program plans submitted to the NRC as identified in the SERs listed above.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the IWF ISI Program. Review of plant-specific operating experience revealed no age-related failures of any supports within the scope of the IWF ISI Program.

The plant continuously reviews industry operating experience to determine its applicability to NMPNS and adjusts inspection plans accordingly. Plant-specific operating experience is reviewed and trended; findings are documented, reviewed, and resolved; corrective actions are taken; and mitigative actions to limit aging initiated.

Conclusion

The IWF ISI Program has been effective in managing aging of Class 1, 2, and 3 component supports (including piping supports) at NMPNS.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the IWF ISI Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.26 10 CFR 50 APPENDIX J PROGRAM

Program Description

The 10 CFR 50 Appendix J Program [referred to herein as the Containment Leak Rate Test (LRT) Program] is an existing program that detects degradation of the containment structure and components that comprise the containment pressure boundary, including seals and gaskets. It is not relied on to detect the onset or progression of degradation prior to it resulting in leakage. Containment leak rate tests are performed to assure that leakage through the primary containment and systems and components penetrating primary containment does not exceed allowable leakage limits specified in the Technical Specifications. Type A tests measure the primary reactor containment overall integrated leakage rate, and include visual examination of the interior and exterior surfaces of the containment for evidence of structural deterioration. Type B tests measure leakage across each pressure-containing or leakage-limiting boundary, including (1) containment penetrations whose design incorporates resilient seals, gaskets, or sealant

compounds; (2) piping penetrations fitted with expansion bellows; (3) electrical penetrations fitted with flexible metal seal assemblies; (4) air lock door seals; and (5) doors with resilient seals or gaskets. Type C tests measure the leakage rates for containment isolation valves. The Containment LRT Program complies with Option B requirements of 10 CFR 50 Appendix J for primary containment testing with plant-specific exceptions approved by the NRC as part of license amendments, and implements the guidelines provided in NRC Regulatory Guide 1.163 (Reference 16) and NEI 94-01 (Reference 8).

NUREG-1801 Consistency

The Containment LRT Program is an existing program that is consistent with NUREG-1801, Section XI.S4 (10 CFR Part 50, Appendix J) (Reference 2).

Exceptions to NUREG-1801

None. Implementation of Option B requirements for NMP2 required exemptions from certain requirements of 10 CFR 50 Appendix J and exceptions from certain requirements of NRC Regulatory Guide 1.163. These plant-specific alternatives were approved by the NRC prior to implementation (Reference 36) and are not considered to be exceptions to the NUREG-1801 program elements.

Enhancements

None

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Containment LRT Program. Neither NMP1 nor NMP2 has experienced a total leakage rate in the past two refueling outages that was above Containment LRT Program acceptance criteria.

The Containment LRT Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Containment LRT Program has been effective in managing loss of leak-tightness and changes in material properties for components forming the primary containment pressure boundary.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Containment LRT Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.27 MASONRY WALL PROGRAM

Program Description

The Masonry Wall Program is an existing program that manages aging effects so that the evaluation basis established for each masonry wall WSLR remains valid through the period of extended operation. The Masonry Wall Program is based on the structures monitoring requirements of 10 CFR 50.65.

Implementation of the Masonry Wall Program is discussed in the program description for the Structures Monitoring Program (Section B2.1.28).

NUREG-1801 Consistency

The Masonry Wall Program, as implemented by the program listed above, will be consistent with NUREG-1801, Section XI.S5 (Masonry Wall Program) (Reference 2), after enhancements to the Structures Monitoring Program are incorporated.

B2.1.28 STRUCTURES MONITORING PROGRAM

Program Description

The Structures Monitoring Program is an existing program that manages aging of structures, structural components, and structural supports WSLR at NMPNS. The program provides for periodic visual inspections, surveys, and examination of all safety related buildings (including the primary containment and substructures within the primary containment) and various other buildings WSLR. Program activities identify degradation of materials of construction, which include structural steel, concrete, masonry block, sealing materials. While not credited for mitigation of aging, protective coatings are also inspected under this program. The Structures Monitoring Program, which was initially developed to meet the regulatory requirements of 10 CFR 50.65, implements guidance provided in Regulatory Guide 1.160 (Reference 17), NUMARC 93-01 (Reference 9), and NEI 96-03 (Reference 10).

NUREG-1801 Consistency

The Structures Monitoring Program is an existing program that will be consistent with NUREG-1801, Section XI.S6 (Structures Monitoring Program) (Reference 2), after enhancements are incorporated.

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the Structures Monitoring Program include revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Scope - expand the program to include the following activities or components in the scope of License Renewal but not within the current scope of 10 CFR 50.65: (a) NMP2 Fire Rated Assemblies & Watertight Penetration Visual Inspections and (b) NMP2 masonry walls in the Turbine Building and Service Water Tunnel serving a fire barrier function.

Parameters Monitored/Inspected, **Detection of Aging Effects, Acceptance Criteria** - expand the parameters monitored during structural inspections to include those relevant to aging effects identified for structural bolting.

Enhancements are scheduled for completion prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Structures Monitoring Program. Since implementation of inspections under the Structures Monitoring Program, minor cracking has been identified in various concrete structures and slight (but stable) ground water leaks have occurred in some tunnels. However, a review of plant-specific operating experience revealed no cases of structural failure caused by unidentified degradation. Similarly, no structural deficiencies have been identified in flood control structures.

The Structures Monitoring Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Structures Monitoring Program has been effective in managing aging effects to which structural materials are susceptible.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Structures Monitoring Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.29 NON-EQ ELECTRICAL CABLES AND CONNECTIONS PROGRAM

Program Description

The Non-EQ Electrical Cables and Connections Program is a new program that manages aging of cables and connectors WSLR exposed to adverse localized temperature, moisture, or radiation environments. Program activities include visual inspection of susceptible cables for evidence of cable and connection jacket surface anomalies. Inspections are conducted at least once every ten years, with the first representative sample of susceptible cables inspected prior to expiration of the current NMPNS licenses.

NUREG-1801 Consistency

The Non-EQ Electrical Cables and Connections Program is a new program that will be implemented prior to the period of extended operation in a manner consistent with NUREG-1801, Section XI.E1 (Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements) (Reference 2).

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Non-EQ Electrical Cables and Connections Program is a new program at NMPNS; therefore, no programmatic operating experience is available. As operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

There is reasonable assurance that aging effects will be managed by the implementation of the Non-EQ Electrical Cables and Connections Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.30 NON-EQ ELECTRICAL CABLES USED IN INSTRUMENTATION CIRCUITS PROGRAM

Program Description

The Non-EQ Electrical Cables Used in Instrumentation Circuits Program is an existing program that manages aging of cables exposed to adverse localized temperature and radiation environments that could result in loss of insulation resistance. It applies to accessible and inaccessible electrical cables that are not in the EQ Program and are used in circuits with sensitive, high-voltage, low-level signals such as radiation monitoring, nuclear instrumentation, and other non-nuclear instrumentation that are WSLR. Activities include routine calibration tests of instrumentation loops and are implemented through the Surveillance Testing and Preventive Maintenance Programs. Testing is based on requirements of the plant technical specifications and implemented through the NMPNS work control system.

NUREG-1801 Consistency

The Non-EQ Electrical Cables Used in Instrumentation Circuits Program is an existing program that will be consistent with NUREG-1801, Section XI.E2 (Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits) (Reference 2) after enhancements are incorporated.

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the Non-EQ Electrical Cables Used in Instrumentation Circuits Program include revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following element:

Detection of Aging Effects:

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

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

Enhancements are scheduled for completion prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the Non-EQ Electrical Cables Used in Instrumentation Circuits Program. Review of plant-specific operating experience revealed documentation of cable degradation identified through routine calibration testing that is similar to the industry operating experience (e.g., degraded cables for temperature instruments, degraded shielding for drywell instrument cables).

The Non-EQ Electrical Cables Used in Instrumentation Circuits Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Non-EQ Electrical Cables Used in Instrumentation Circuits Program has been effective in managing aging effects, including loss of insulation resistance in instrumentation cables.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Non-EQ Electrical Cables Used in Instrumentation Circuits Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.31 NON-EQ INACCESSIBLE MEDIUM VOLTAGE CABLES PROGRAM

Program Description

The Non-EQ Inaccessible Medium Voltage Cables Program is a new program that provides reasonable assurance that the intended functions of inaccessible medium-voltage cables that are not subject to the environmental qualification requirements of 10 CFR 50.49, and are potentially exposed to adverse localized environments caused by moisture and significant voltage, are maintained consistent with the current licensing basis through the period of extended operation. Program activities include visual inspections of accessible areas of ducts and banks via manholes or inspection covers, and testing if warranted by an engineering evaluation. The program considers the technical information and guidance provided in References 20, 21, 22, and 23.

NUREG-1801 Consistency

The Non-EQ Inaccessible Medium-Voltage Cables Program is a new program that will be implemented prior to the period of extended operation in a manner consistent with NUREG-1801, Section XI.E3 (Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements) (Reference 2).

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Non-EQ Inaccessible Medium Voltage Cables Program is a new program at NMPNS; therefore, no programmatic operating experience is available. As operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

There is reasonable assurance that aging effects will be managed by the implementation of the Non-EQ Inaccessible Medium Voltage Cables Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.32 PREVENTIVE MAINTENANCE PROGRAM

Program Description

The Preventive Maintenance (PM) Program is an existing plant-specific program that consists of the appropriate ten elements described in Appendix A of NUREG-1800 (Reference 1). The PM Program manages aging effects for SSCs WSLR. The program provides for performance of various maintenance activities on a specified frequency based on vendor recommendations and operating experience.

Aging Management Program Elements

The key elements of aging management activities, which are used in the PM Program, are described below. The results of an evaluation of each key element against the appropriate ten elements described in Appendix A of NUREG-1800 are provided below.

Scope of Program

The PM Program manages aging effects for many SSCs WSLR whose aging is not managed by other AMPs. The scope of the program includes, but is not limited to, valve bodies, heat exchangers, expansion joints, tanks, ductwork, fan/blower housings, dampers, and pump casings.

Preventive Actions

Although routine maintenance is largely preventive in nature, only the condition monitoring aspects of PM Program activities are credited for license renewal. For example, when a piping system is opened to conduct

preventive maintenance on a valve, a visual inspection of the valve body and/or piping may be specified. Such activities do not prevent aging effects from occurring, but will identify degraded conditions that would affect the ability of the component to perform its intended function. Consequently, there are no specific preventive actions associated with this program.

Parameters Monitored/Inspected

Inspection and testing activities monitor various parameters, including surface condition, for evidence of defects and age-related degradation.

Detection of Aging Effects

The aging effects of concern will be detected by visual inspection and examination of component surfaces for evidence of defects and age-related degradation.

Monitoring and Trending

The PM Program is a condition-monitoring program performed on a specified schedule. After the inspection results are documented, they are reviewed and evaluated.

Acceptance Criteria

The PM Program establishes specific acceptance criteria for each component inspected. The acceptance criteria are related to the aging effects requiring management and are dependent on each individual inspection and examination considering the aging effect being managed.

Corrective Actions

The program documentation has specific requirements to initiate a DER in accordance with the NMPNS Corrective Action Program. The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the NMPNS commitment to the corrective action criteria of 10 CFR 50, Appendix B (Reference 3). The NMPNS Corrective Action Program includes the identification and correction of conditions adverse to quality and the identification, cause determination, correction, and actions to minimize recurrence, for significant conditions adverse to quality.

Confirmation Process

The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the confirmation process for NMPNS under the corrective action criterion. At NMPNS, the confirmation process is implemented through Corrective Action Effectiveness Reviews and is performed for significant conditions adverse to quality and selected hardware related conditions adverse to quality. The Corrective Action Program includes, but is not limited to, safety-related, non-safety related and fire protection SSCs. Therefore, those SSCs required to be in-scope for License Renewal are addressed as part of the current Corrective Action Program.

Administrative Controls

The administrative controls for NMPNS are discussed in the plant's Conduct of Operations description (Section XIII in Reference 12 and Chapter 13 in Reference 13) and the Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13). Site procedures provide guidance on procedures and other forms of administrative control documents.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the PM Program as part of a process to optimize maintenance practices. Review of plant-specific operating experience revealed DERs initiated as a result of PM Program examinations. In cases where age-related degradation was identified, the reported conditions (e.g., corrosion of motor-operated valves, piping, heat exchanger internals) were resolved through implementation of the work order process prior to loss of an intended function.

The PM Program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Exceptions to NUREG-1800

None

Enhancements

Enhancements to the PM Program include revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Scope - expand the PM Program to encompass activities for certain additional components, identified in the LR AMRs. Explicitly define the aging management attributes, including the systems and the component types/commodities included in the program.

Preventive Actions - specifically list those activities credited for aging management.

Parameters Monitored/Inspected - specifically list parameters monitored.

Detection of Aging Effects - specifically list the aging effects detected.

Monitoring and Trending – establish a requirement that inspection data be monitored and trended.

Acceptance Criteria – establish detailed parameter-specific acceptance criteria.

Enhancements are scheduled for completion prior to the period of extended operation.

Conclusion

The PM Program has been effective in maintaining the intended functions of long-lived passive SSCs. The effectiveness of the PM Program is also reflected in the level of system/equipment availability documented by Maintenance Rule Periodic Assessments.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the PM Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.33 SYSTEMS WALKDOWN PROGRAM

Program Description

The Systems Walkdown Program is an existing plant-specific program that consists of the appropriate ten elements described in Appendix A of NUREG-1800 (Reference 1). The Systems Walkdown Program manages aging effects for accessible external surfaces of selected SSCs WSLR at NMPNS. The specific aging effect of concern is loss of material from external surfaces of pumps, valves, piping, bolts, heat exchangers, tanks, expansion joints, electrical penetrations, electrical enclosures and cabinets, HVAC components, and other carbon steel components. Program activities include system engineer walkdowns (i.e., field evaluations of system components to assess system performance and material condition), evaluation of inspection results, and appropriate corrective actions.

Aging Management Program Elements

The key elements of aging management activities, which are used in the Systems Walkdown Program, are described below. The results of an evaluation of each key element against the appropriate ten elements described in Appendix A of NUREG-1800 are provided below.

Scope of Program

The scope of the Systems Walkdown Program will be accessible external surfaces of structures and components WSLR and subject to AMR. The inspections will look for loss of material, material degradation, and leakage.

Preventive Actions

The Systems Walkdown Program is a condition monitoring program, which mitigates degradation through regular inspection of in-scope components and identification of degraded conditions that could affect the ability of the component to perform its intended function. Consequently, there are no specific preventive actions associated with this program other than the identification of the aging effects of concern before damage to the component or the pressure boundary occurs.

Parameters Monitored/Inspected

System engineers conduct visual inspections of assigned SSCs and document the presence of corrosion and other signs of deterioration.

Detection of Aging Effects

The aging effects of concern will be detected and documented through visual inspections performed during system walkdowns. The frequency of inspections is at least once per refuel cycle for each structure and system. This frequency is sufficient since the aging effects are typically caused by long-term degradation.

Monitoring and Trending

The Systems Walkdown Program describes the monitoring and assessment of SSCs, but does not currently include requirements for monitoring and trending of applicable parameters.

Acceptance Criteria

The Systems Walkdown Program does not currently include specific acceptance criteria for applicable parameters. A list of walkdown attributes is available to system engineers for use in developing walkdown checklists.

Corrective Actions

The Systems Walkdown Program requires appropriate corrective action anytime an unusual or unfamiliar condition is observed. Corrective actions are documented using the DER process. The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the NMPNS commitment to the corrective action criteria of 10 CFR 50, Appendix B (Reference 3). The NMPNS Corrective Action Program includes the identification and correction of conditions adverse to quality and the identification, cause determination, correction, and actions to minimize recurrence for significant conditions adverse to quality.

Confirmation Process

The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the confirmation process for NMPNS under the corrective action criterion. At NMPNS, the confirmation process is implemented through Corrective Action Effectiveness Reviews and is performed for significant conditions adverse to quality and selected hardware related conditions adverse to quality. The Corrective Action Program includes, but is not limited to, safety-related, non-safety related and fire protection SSCs. Therefore, those SSCs required to be in-scope for License Renewal are addressed as part of the current Corrective Action Program.

Administrative Controls

The Systems Walkdown Program is currently implemented through department administrative instructions which are not subject to the 10 CFR 50 Appendix B administrative controls program. The implementing documents will be upgraded to department procedures, which are part of the administrative controls program.

The administrative controls for NMPNS are discussed in the plant's Conduct of Operations description (Section XIII in Reference 12 and Chapter 13 in Reference 13) and the Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13).

Operating Experience

The Systems Walkdown Program has relied upon system health reports to document the overall material condition of various plant systems. As such, operating experience has been incorporated into the system health reports and not directly into the Systems Walkdown Program. Enhancements will be made to this program to include previous operating experience and to ensure future operating experience is properly incorporated.

A review of the corrective action history related to material condition demonstrates the past usefulness of walkdowns in identifying visually detectable age-related degradation (e.g., general corrosion of bolting, supports, and component surfaces). As additional operating experience is obtained, lessons learned will be used to adjust the System Walkdown Program as needed.

Exceptions to NUREG-1800

None

Enhancements

Enhancements to the Systems Walkdown Program include revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Scope - explicitly state the aging management attributes, including the systems and component types/commodities included in the program.

Parameters Monitored/Inspected - specifically list parameters monitored and provide guidance for assessment of identified deterioration. This will include extent of corrosion (loss of material), condition of coatings (material degradation), leakage, or indications of leakage, etc.

Detection of Aging Effects

- Components WSLR included in the Systems Walkdown Program will be visually inspected for loss of material, material degradation, and leakage per the upgraded program documentation. The frequency of inspections will be at least once per refuel cycle for each structure and system.

- Define a methodology that specifies consistent criteria for program data collection.

Monitoring and Trending - specify the parameters and data that will be monitored and trended.

Acceptance Criteria - specify acceptance criteria for visual inspections that will ensure component intended function(s) are maintained under CLB design conditions during the period of extended operation.

Administrative Controls – upgrade program documents so that they fall under the administrative controls program.

Operating Experience - include previous operating experience and ensure future operating experience is properly incorporated.

Enhancements are scheduled for completion prior to the period of extended operation.

Conclusion

Recording and reporting visually detectable degradation has been part of good engineering practice at NMPNS for many years, and this practice will continue under the Systems Walkdown Program. This process has been effective in maintaining the intended functions of long-lived passive SSCs. The Systems Walkdown Program has been enhanced since its inception, and further improvements will be implemented prior to the period of extended operation.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Systems Walkdown Program such

that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.34 NON-SEGREGATED BUS INSPECTION PROGRAM

The Non-Segregated Bus Inspection Program is a new plant-specific program that will consist of the appropriate ten elements described in Appendix A of NUREG-1800 (Reference 1). This program inspects components and materials internal to the non-segregated bus ducts that connect the reserve auxiliary transformers to the 4160V buses required for the recovery of offsite power to both units following a Station Blackout (SBO) event. They are normally energized, and therefore, the bus duct insulation material will experience temperature rise due to energization, which may cause age-related degradation during the extended period of operation. This inspection program considers the technical information and guidance provided in References 20, 21, 22, and 23. This program will be implemented prior to the period of extended operation.

Aging Management Program Elements

The key elements of aging management activities, which are used in the Non-Segregated Bus Inspection Program, are described below. The results of an evaluation of each key element against the appropriate ten elements described in Appendix A of NUREG-1800 are provided below.

Scope of Program

The Non-Segregated Bus Inspection Program manages aging effects for the non-segregated bus ducts that connect the reserve auxiliary transformers to the 4160V buses required for the recovery of offsite power to both units following an SBO event. These normally-energized components are not subject to the environmental qualification requirements of 10 CFR 50.49, but can be affected by elevated temperatures prior to the end of the extended period of operation.

Preventive Actions

The Non-Segregated Bus Inspection Program is a condition monitoring program, which requires regular inspection of in scope components and identification of degraded conditions that would affect the ability of the component to perform its intended function. Consequently, there are no specific preventive actions associated with this program other than the identification of the aging effects of concern before a loss of intended function occurs.

Parameters Monitored/Inspected

Accessible normally-energized non-segregated bus duct internal components are visually inspected for surface anomalies, such as embrittlement, discoloration, cracking, chipping, or surface contamination, which could affect the life of the component.

Detection of Aging Effects

The aging effects of concern will be detected through visual inspections of normally-energized non-segregated bus ducts that connect the reserve auxiliary transformers to the 4160V ESF buses at least once every 10 years. The inspections will detect material surface anomalies, which are precursors to any onset of insulation failure. The frequency is adequate to preclude age-related failures of the conductor insulation. The entire population of components WSLR is inspected, so sampling is not used.

Monitoring and Trending

Monitoring and trending will not be used for this AMP. See "Exceptions to NUREG-1800," below.

Acceptance Criteria

The bus ducts WSLR are to be free from unacceptable visual indications, which suggest that bus duct insulation degradation exists. Such aging, if left unmanaged, could lead to a loss of the intended function.

Corrective Actions

Corrective actions are documented using the DER process. The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the NMPNS commitment to the corrective action criteria of 10 CFR 50, Appendix B (Reference 3). The NMPNS Corrective Action Program includes the identification and correction of conditions adverse to quality and the identification, cause determination, correction, and actions to minimize recurrence for significant conditions adverse to quality.

Confirmation Process

The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the confirmation process for NMPNS under the corrective action criterion. At NMPNS, the confirmation process is implemented through Corrective Action Effectiveness Reviews and is performed for significant conditions

adverse to quality and selected hardware related conditions adverse to quality. The Corrective Action Program includes, but is not limited to, safety-related, non-safety related and fire protection SSCs. Therefore, those SSCs required to be in-scope for License Renewal are addressed as part of the current Corrective Action Program.

Administrative Controls

The Non-Segregated Bus Inspection Program will be implemented through documents that are subject to administrative controls. The administrative controls for NMPNS are discussed in the plant's Conduct of Operations description (Section XIII in Reference 12 and Chapter 13 in Reference 13) and the Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13).

Operating Experience

The Non-Segregated Bus Inspection Program is a new program at NMPNS; therefore, no programmatic operating experience is available. As operating experience is obtained, lessons learned will be used to adjust this program as needed.

Exceptions to NUREG-1800

Program Elements Affected

- **Monitoring and Trending**:

  Over a 20 year inspection period, some data may be available which will permit a subjective determination of degradation rates. However, proceduralized analytical trending will not be included in this activity because the parameters inspected are not readily quantifiable in an appropriate form.

Enhancements

None

Conclusion

There is reasonable assurance that aging effects will be managed by the implementation of the Non-Segregated Bus Inspection Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.35 FUSE HOLDER INSPECTION PROGRAM

Program Description

The Fuse Holder Inspection Program is a new plant-specific program that will consist of the appropriate ten elements described in Appendix A of NUREG-1800 (Reference 1).

Fuse holders/blocks are classified as a specialized type of terminal block because of the similarity in design and construction. The fuse holders are typically constructed of blocks of rigid insulating material, such as phenolic resins. Metallic clamps are attached to the blocks to hold each end of the fuse. The clamps can be spring-loaded clips that allow the fuse ferrules or blades to slip in, or they can be bolt lugs, to which the fuse ends are bolted. The clamps are typically made of copper. The Fuse Holder Inspection Program includes the following aging stressors: moisture, fatigue, ohmic heating, mechanical stress, vibration, thermal cycling, electrical transients, chemical contamination, oxidation, and corrosion.

Aging Management Program Elements

The key elements of aging management activities, which are used in the Fuse Holder Inspection Program, are described below. The results of an evaluation of each key element against the appropriate ten elements described in Appendix A of NUREG-1800 are provided below.

Scope of Program

The Fuse Holder Inspection (FHI) Program applies to fuse holders located outside of active devices that have aging effects requiring management.

Preventive Actions

The FHI Program is a condition monitoring program, which requires regular inspection of in-scope components and identification of degraded conditions that would affect the ability of the component to perform its intended function. Consequently, there are no specific preventive actions associated with this program other than the identification of the aging effects of concern before a loss of intended function occurs.

Parameters Monitored/Inspected

Monitored parameters will include high resistance of the metallic clamp (or clip) portion of the fuse holder. This will detect fatigue caused by ohmic

heating, thermal cycling, electrical transients, mechanical stress, chemical contamination, corrosion and oxidation.

Detection of Aging Effects

Fuse holders will be tested at least once every 10 years. Testing will include thermography, contact resistance testing, or other appropriate testing methods. This is an adequate period to preclude failures of the fuse holders since experience has shown that aging degradation is a slow process. A 10-year inspection frequency will provide two data points during a 20-year period, which can be used to characterize degradation rate. The first tests for license renewal will be completed prior to the period of extended operation.

Monitoring and Trending

Monitoring and trending will not be used for this AMP. See “Exceptions to NUREG-1800,” below.

Acceptance Criteria

The specific type of test to be performed, and the specific fuse holder tested will define the acceptance criteria for each test.

Corrective Actions

Corrective actions are documented using the DER process. The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the NMPNS commitment to the corrective action criteria of 10 CFR 50, Appendix B (Reference 3). The NMPNS Corrective Action Program includes the identification and correction of conditions adverse to quality and the identification, cause determination, correction, and actions to minimize recurrence for significant conditions adverse to quality.

Confirmation Process

The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the confirmation process for NMPNS under the corrective action criterion. At NMPNS, the confirmation process is implemented through Corrective Action Effectiveness Reviews and is performed for significant conditions adverse to quality and selected hardware related conditions adverse to quality. The Corrective Action Program includes, but is not limited to, safety-related, non-safety related and fire protection SSCs. Therefore,

those SSCs required to be in-scope for License Renewal are addressed as part of the current Corrective Action Program.

Administrative Controls

The Fuse Holder Inspection Program will be implemented through documents that are subject to administrative controls. The administrative controls for NMPNS are discussed in the plant's Conduct of Operations description (Section XIII in Reference 12 and Chapter 13 in Reference 13) and the Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13).

Operating Experience

The Fuse Holder Inspection Program is a new program at NMPNS; therefore, no programmatic operating experience is available. As operating experience is obtained, lessons learned will be used to adjust this program as needed.

Exceptions to NUREG-1800

Program Elements Affected

- **Monitoring and Trending:**

  Analytical trending will not be included in this activity because the parameters monitored may vary depending upon the test method selected.

Enhancements

None

Conclusion

There is reasonable assurance that aging effects will be managed by the implementation of the Fuse Holder Inspection Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B3.0 TLAA EVALUATION OF AGING MANAGEMENT PROGRAMS UNDER 10 CFR 54.21(c)(1)(iii)

The correlation between NUREG-1801 (Section X) programs and NMPNS programs is shown below. For the NMPNS Programs, links to appropriate sections of this appendix are provided.

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	NINE MILE POINT PROGRAM
X.M1	Metal Fatigue of Reactor Coolant Pressure Boundary	Fatigue Monitoring Program (Section B3.2)
X.S1	Concrete Containment Tendon Prestress	Not applicable. The NMP1 and NMP2 containments do not have prestressed concrete containment designs.
X.E1	Environmental Qualification (EQ) of Electrical Components	Environmental Qualification Program (Section B3.1)
NA	Plant-Specific Program	Torus Corrosion Monitoring Program (NMP1 only) (Section B3.3)

B3.1 ENVIRONMENTAL QUALIFICATION PROGRAM

Program Description

The EQ Program is an existing program that manages thermal, radiation, and cyclical aging for electrical equipment important to safety and located in harsh plant environments at NMPNS. At NMP2, the EQ Program also manages these effects for active safety-related mechanical equipment located in harsh plant environments. Program activities (1) identify applicable equipment and environmental requirements; (2) establish, demonstrate, and document the level of qualification (including configuration, maintenance, surveillance, and replacement requirements); and (3) maintain (or preserve) qualification. The EQ Program employs aging evaluations based on 10 CFR 50.49(f) qualification methods. Components in the EQ Program must be refurbished, replaced, or have their qualification extended prior to reaching the aging limits established in the evaluation. Aging evaluations for environmentally qualified components that specify a qualification of at least 40 years are considered

TLAAs for LR. The EQ Program ensures that these SSCs are maintained within the bounds of their qualification bases.

NUREG-1801 Consistency

The EQ Program is an existing program that is consistent with NUREG-1801, Section X.E1 [Environmental Qualification (EQ) of Electrical Components] (Reference 2).

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The NMPNS EQ Program started in 1980 as a project at NMP1, and was developed as an integral part of construction at NMP2. Since its inception, consideration of plant and industry operating experience has been an important element of the EQ Program. Recorded measurements of ambient temperature have been used to define conditions for some harsh environments, and records of representative actual temperatures have been used as preliminary data to resolve concerns for certain terminal blocks installed in the NMP1 drywell. Qualified life evaluations for certain sealing materials and lamp assemblies were reevaluated to remove excess conservatism and eliminate unnecessary maintenance activities.

The NRC has resolved Generic Safety Issue (GSI) 168, which is related to low-voltage EQ instrumentation and control cables, with no new requirements for licensees (Reference 14). Consistent with NRC guidance, no additional information is required to address GSI-168.

The EQ Program is continually adjusted to account for industry experience and research. Internal and external reviewers have frequently assessed the EQ Program. The program has also evolved as administrative improvements were identified to address issues such as communication and organizational transitions. A major program reconstitution effort began in 2003, in response to internal assessments, to improve the overall strength of the EQ Program. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The EQ Program has been effective in managing thermal, radiation, and cyclical aging for components within the scope of 10 CFR 50.49.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the EQ Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation. This result meets the requirements of 10 CFR 54.21(c)(1)(iii).

B3.2 FATIGUE MONITORING PROGRAM

Program Description

The Fatigue Monitoring Program (FMP) is an existing program that manages the fatigue life of reactor coolant pressure boundary components by tracking and evaluating key plant events. Events were selected based upon plant-specific evaluations of the most fatigue-limited locations for critical components, including those discussed in NUREG/CR-6260 (Reference 18). The FMP monitors operating transients to-date, calculates fatigue usage factors to-date, and permits implementation of corrective measures in order not to exceed the design limit on fatigue usage.

The effects of reactor coolant environment will be considered through the evaluation of, as a minimum, those components selected in NUREG/CR-6260 using the appropriate environmental fatigue factors.

The design basis metal fatigue analyses for the reactor coolant pressure boundary are considered TLAAs for license renewal. The FMP provides an analytical basis for confirming that the number of cycles established by the analysis of record will not be exceeded before the end of the period of extended operation. In order to determine cumulative usage factors (CUFs) more accurately, the FMP will implement FatiguePro fatigue monitoring software. This provides an analytical basis for confirming that the number of cycles established by the analysis of record will not be exceeded before the end of the period of extended operation.

NUREG-1801 Consistency

The FMP is an existing program that will be consistent with NUREG-1801, Section X.M1 (Metal Fatigue of Reactor Coolant Pressure Boundary) (Reference 2), after enhancements are incorporated.

Exceptions to NUREG-1801

None

Enhancements

Enhancements to the FMP include revisions to existing activities that will be credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

Preventive Action - The FMP will be enhanced with guidance for the use of the FatiguePro software package and updated methodology for environmental fatigue factors in establishing updated fatigue life calculations for components.

The enhancement is scheduled for completion prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience relating to the FMP. In instances where the potential existed to exceed CUFs before the end of plant life, the engineering analyses showed that actual margins were larger than initially estimated. A noteworthy result of these fatigue evaluations was the recognition that the FMP could benefit from the use of analytical fatigue software such as FatiguePro. DERs written in 2003 identified opportunities for programmatic improvement. This led to the establishment of a comprehensive FMP document, additional reviews of cycle records with an emphasis on NMP1, and a proposal for the implementation of fatigue analysis software.

The FMP is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The FMP has been effective in managing the effects of fatigue on the intended functions of long-lived passive SSCs. Program activities provide a proactive monitoring of fatigue stresses on key components chosen for their limiting nature on the design fatigue life of the plant.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the FMP such that SSCs WSLR will continue to perform their intended functions consistent with the CLB for the period of extended operation. This result meets the requirements of 10 CFR 54.21(c)(1)(iii).

B3.3 TORUS CORROSION MONITORING PROGRAM (NMP1 ONLY)

Program Description

The Torus Corrosion Monitoring Program is an existing plant-specific program that consists of the appropriate ten elements described in Appendix A of NUREG-1800 (Reference 1). The Torus Corrosion Monitoring Program manages corrosion of the NMP1 suppression chamber (torus) through inspection and analysis, and is based on a commitment to periodically monitor torus condition described in an NRC SER dated August 11, 1994 (Reference 19). The aging evaluation that specifies minimum wall thickness for the NMP1 torus shell is considered a TLAA for license renewal. The Torus Corrosion Monitoring Program ensures that the NMP1 torus wall and support structure thickness limits are not exceeded. (Note: this program only applies to NMP1 because NMP2 is a Mark II containment and does not have a torus).

Aging Management Program Elements

The key elements of aging management activities, which are used in the Torus Corrosion Monitoring Program, are described below. The results of an evaluation of each key element against the appropriate ten elements described in Appendix A of NUREG-1800 are provided below.

Scope of Program

The Torus Corrosion Monitoring Program manages aging effects for steel elements forming the NMP1 torus. The program provides for (1) determination of torus shell thickness through ultrasonic (UT) measurement; (2) determination of corrosion rate through analysis of material coupons; and (3) visual inspection of accessible external surfaces of the torus support structure for corrosion.

Preventive Actions

The Torus Corrosion Monitoring Program is a condition monitoring program; there are no specific preventive actions associated with this program.

Parameters Monitored/Inspected

The torus shell wall thickness is monitored through the torus UT measurement activities and the torus coupon analysis activities Additionally, the condition of the torus external support structure is monitored by visual inspection to identify corrosion or any deficient condition.

Detection of Aging Effects

The torus shell and the torus external support structure are periodically inspected for loss of material through a combination of thickness measurements, coupon analysis, and visual examination. The torus shell thickness is measured using UT methods. The torus shell corrosion rate is determined through the torus coupon analysis activity where coupons are periodically removed, analyzed, and compared to the results of the UT measurement activity. Torus wall UT measurements are obtained at approximately six-month intervals over a predefined grid system, and corrosion sample coupons are analyzed during each refueling outage. Corrosion rates are determined through analysis of both data sets, and the most conservative corrosion rate for a particular torus bay is used to evaluate aging of the structure. Monitoring in this manner ensures the torus shell material will not be reduced to less than the minimum required wall thickness, and that any degradation is detected before there is a loss of intended function.

Monitoring and Trending

The measurement activities described above are performed on a predefined schedule; thus, corrosion and thickness data for the torus shell are collected and analyzed over time. The UT results and corrosion rate data are trended and retained for future reference. The corrosion rate data is analyzed to determine the most conservative corrosion rate for a particular torus bay. Torus external support structure visual inspection findings are compared to the results of previous inspections.

Acceptance Criteria

The Torus Corrosion Monitoring Program establishes acceptance criteria for local thickness, average Torus wall thickness and corrosion rate. The minimum wall thickness and corrosion rate limits are defined to ensure that the minimum wall thickness requirement will not be violated before the next scheduled inspection. Degradation of Torus external support structure components is evaluated to ensure intended functions are not compromised before the next scheduled inspection.

Corrective Actions

Corrective actions are documented using the DER process. The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the NMPNS commitment to the corrective action criteria of 10 CFR 50, Appendix B (Reference 3). The NMPNS Corrective Action Program includes the identification and correction of conditions adverse to quality and the identification, cause determination, correction, and actions to minimize recurrence for significant conditions adverse to quality.

Confirmation Process

The Quality Assurance Program Topical Report (Appendix B to Reference 12 and Appendix B to Reference 13) documents the confirmation process for NMPNS under the corrective action program. At NMPNS, the confirmation process is implemented through Corrective Action Effectiveness Reviews and is performed for significant conditions adverse to quality and selected hardware related conditions adverse to quality. The Corrective Action Program includes, but is not limited to, safety-related, non-safety related and fire protection SSCs. Therefore, those SSCs required to be WSLR are addressed as part of the current Corrective Action Program.

Administrative Controls

The Torus Corrosion Monitoring Program is implemented through documents that are subject to administrative controls. The administrative controls for NMP1 are discussed in the plant's Conduct of Operations description (Section XIII in Reference 12) and the Quality Assurance Program Topical Report (Appendix B to Reference 12).

Operating Experience

Torus wall thinning was observed in the late 1980s following an extended plant shutdown. The wall thinning was attributed to the layup conditions inside the Torus during the extended shutdown. In lieu of various proposed modifications to cope with this plant-specific operating experience, the NRC approved the NMP1 Torus Corrosion Monitoring Program in an SER dated August 25, 1992 (Reference 37). The NRC approved updates to the program in an SER dated August 11, 1994 (Reference 38).

Review of plant-specific operating experience revealed no discrepancies related to Torus Corrosion Monitoring Program examinations. The Torus Corrosion Monitoring Program is continually adjusted to account for industry

experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Exceptions to NUREG-1800

None

Enhancements

None

Conclusion

The Torus Corrosion Monitoring Program has been effective in maintaining the intended function of the NMP1 torus shell and associated support structure. Program evaluations sufficiently demonstrate that the torus shell material will not be reduced to less than the minimum required wall thickness in any future operation.

Therefore, there is reasonable assurance that aging effects will be managed by the continued implementation of the Torus Corrosion Monitoring Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation. This result meets the requirements of 10 CFR 54.21(c)(1)(iii).

B4.0 REFERENCES

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27. Letter from U.S. Nuclear Regulatory Commission to Exelon Corporation dated September 13, 2002, *Subject: License Renewal Safety Evaluation Report with Open and Confirmatory Items for the Peach Bottom Atomic Power Station, Units 2 and 3*.

28. EPRI TR-103515-R2, *BWR Water Chemistry Guidelines – 2000 Revision*, February 2000.

29. Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated August 17, 2000, *Subject: Nine Mile Point Nuclear Station, Unit Nos. 1 and 2 – Relief from the Requirements of 10 CFR 50.55a Related to Containment Inspection (TAC Nos. MA7116, MA7117, and MA7118)*.

30. Letter from Nine Mile Point Nuclear Station, LLC, (NMP1L 1804) to U.S. Nuclear Regulatory Commission dated January 29, 2004, *Subject: Nine Mile Point Unit 1, Docket No. 50-220, Facility Operating License No. DPR-63 – License Amendment Request: Revision to the Reactor Pressure Vessel Material Surveillance Program*.

31. Letter from Nine Mile Point Nuclear Station, LLC, (NMP2L 2109) to U.S. Nuclear Regulatory Commission dated January 29, 2004, *Subject: Nine Mile Point Unit 2, Docket No. 50-410, Facility Operating License No. NPF-69 – License Amendment Request: Revision to the Reactor Pressure Vessel Material Surveillance Program*.

32. Letter from U.S. Nuclear Regulatory Commission to BWRVIP Chairman dated February 1, 2002, *Subject: Safety Evaluation Regarding ERPI Proprietary Reports "BWR Vessel and Internals Project, BWR Integrated Surveillance Program Plan (BWRVIP-78)" and "BWRVIP-86: BWR Vessel and Internals Project, BWR Integrated Surveillance Program Implementation Plan".*

33. EPRI TR-1007824, *BWRVIP-116: BWR Vessel and Internals Project, Integrated Surveillance Program (ISP) Implementation for License Renewal*, July 2003.

34. Letter from Nine Mile Point Nuclear Station, LLC, (NMP1L 1748) to U.S. Nuclear Regulatory Commission dated July 23, 2003, *Subject: Subject: Nine Mile Point Unit 1, Docket No. 50-220, Facility Operating License No. DPR-63 – Submittal of Inservice Inspection Owners Activity Reports*.

35. Letter from Niagara Mohawk Power Corporation (NMP2L 1976) to U.S. Nuclear Regulatory Commission dated July 18, 2000, *Subject: Inservice Inspections (ISI) Summary Report*.

36. Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated August 13, 1996, *Subject: Issuance of Amendment for Nine Mile Point Nuclear Station, Unit 2 (TAC No. M94641)*.

37. Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated August 25, 1992, *Subject: Proposed Deferment of Nine Mile Point Nuclear Station Unit No. 1 Torus Modifications (TAC No. M80214)*.

38. Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated August 11, 1994, *Subject: Approval of Reduction Factors for Condensation Oscillation Loads in Nine Mile Point Nuclear Station Unit No. 1 (NMP1) Torus (TAC No. M85003)*.

39. Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated March 30, 2000, *Subject: Nine Mile Point Nuclear Station Unit No. 2 (NMP2) – Alternative to American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Requirements for Repair of Recirculation and Feedwater Nozzle to Safe-End Welds at NMP2 (TAC No. MA8352)*.

40. Regulatory Guide 1.147, Revision 13 (reprinted), *Inservice Inspection Code Case Applicability, ASME Section XI, Division 1*, January 2004.

41. Letter from U.S. Nuclear Regulatory Commission to Nine Mile Point Nuclear Station, LLC, dated September 4, 2002, *Subject: Nine Mile Point Nuclear Station, Unit No. 1 – Risk-Informed Inservice Inspection Program (TAC No. MB4085)*.