APPENDIX B
AGING MANAGEMENT PROGRAMS AND ACTIVITIES

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B.0 INTRODUCTION

B.0.1 OVERVIEW

The aging management review results for the integrated plant assessment of Vermont Yankee Nuclear Power Station (VYNPS) are presented in Sections 3.1 through 3.6 of this application. The programs credited in the integrated plant assessment for managing aging effects are described in this appendix.

Each aging management program described in this appendix has ten elements in accordance with the guidance in NUREG-1800 (Reference B.1-1) Appendix A.1, “Aging Management Review - Generic,” Table A.1-1, “Elements of an Aging Management Program for License Renewal.” For aging management programs that are comparable to the programs described in Sections X and XI of NUREG-1801 (Reference B.2-2), “Generic Aging Lessons Learned (GALL) Report,” the ten elements have been compared to the elements of the NUREG-1801 program. For plant-specific programs which do not correlate with NUREG-1801, the ten elements are addressed in the program description.

B.0.2 FORMAT OF PRESENTATION

For those aging management programs that are comparable to the programs described in Sections X and XI of NUREG-1801, the program discussion is presented in the following format:

- **Program Description** — abstract of the overall program.
- **NUREG-1801 Consistency** — summary of the degree of consistency between the VYNPS program and the corresponding NUREG-1801 program, when applicable (i.e., degree of similarity, etc.).
- **Exceptions to the NUREG-1801** — exceptions to the NUREG1801 program, including a justification for the exceptions (when applicable).
- **Enhancements** — future program enhancements with a proposed schedule for their completion (when applicable), including additional program features to manage aging effects not addressed by the NUREG-1801 program.
- **Operating Experience** — discussion of operating experience information specific to the program.
- **Conclusion** — statement of reasonable assurance that the program is effective, or will be effective, once implemented with necessary enhancements.

For plant-specific programs, the above format is generally followed, with additional discussion of each of the ten elements.

B.0.3 VYNPS CORRECTIVE ACTIONS, CONFIRMATION PROCESS AND ADMINISTRATIVE CONTROLS

Three attributes common to all aging management programs are corrective actions, confirmation process and administrative controls. Discussion of these attributes is presented below. Corrective actions have program-specific details which are included in the descriptions of the individual programs in this report, but further discussion of the confirmation process and administrative controls is not necessary and is not included in the descriptions of the individual programs.

Corrective Actions

VYNPS quality assurance (QA) procedures, review and approval processes, and administrative controls are implemented in accordance with the requirements of 10 CFR Part 50, Appendix B. Conditions adverse to quality, such as failures, malfunctions, deviations, defective material and equipment, and nonconformances, are promptly identified and corrected. In the case of significant conditions adverse to quality, measures are implemented to ensure that the cause of the nonconformance is determined and that corrective action is taken to preclude recurrence. In addition, the root cause of the significant condition adverse to quality and the corrective action implemented are documented and reported to appropriate levels of management.

Confirmation Process

VYNPS quality assurance (QA) procedures, review and approval processes, and administrative controls are implemented in accordance with the requirements of 10 CFR Part 50, Appendix B. The VYNPS Quality Assurance Program applies to safety-related structures and components. Corrective actions and administrative (document) control for both safety-related and nonsafety-related structures and components are accomplished per the existing VYNPS corrective action program and document control program. The confirmation process is part of the corrective action program and includes

- reviews to assure that proposed actions are adequate,
- tracking and reporting of open corrective actions, and
- review of corrective action effectiveness.

Any follow-up inspection required by the confirmation process is documented in accordance with the corrective action program. The corrective action program constitutes the confirmation process for aging management programs and activities. The VYNPS confirmation process is consistent with NUREG-1801.

Administrative Controls

VYNPS quality assurance (QA) procedures, review and approval processes, and administrative controls are implemented in accordance with the requirements of 10 CFR Part 50, Appendix B.

The VYNPS Quality Assurance Program applies to safety-related structures and components. Administrative (document) control for both safety-related and nonsafety-related structures and components is accomplished per the existing document control program. The VYNPS administrative controls are consistent with NUREG-1801.

B.0.4 OPERATING EXPERIENCE

Operating experience for the programs and activities credited with managing the effects of aging was reviewed. Operating experience reviewed included a review of corrective actions resulting in program enhancements. For inspection programs, reports of recent inspections, examinations, or tests were reviewed to determine if aging effects have been identified on applicable components. For monitoring programs, reports of sample results were reviewed to determine if parameters are being maintained as required by the program. Also, program owners contributed evidence of program success or weakness and identified applicable self-assessments, QA audits, peer evaluations, and NRC reviews.

B.0.5 AGING MANAGEMENT PROGRAMS

The following aging management programs are described in the sections listed of this appendix. Programs are identified as either existing or new. The programs are either comparable to programs described in NUREG1801 or are plant-specific. The correlation between NUREG-1801 programs and VYNPS programs is shown in Table B-2, with plant-specific programs listed near the end.

Table B-1
Aging Management Programs

1)	Buried Piping Inspection Program	B.1.1	existing
2)	BWR CRD Return Line Nozzle Program	B.1.2	existing
3)	BWR Feedwater Nozzle Program	B.1.3	existing
4)	BWR Penetrations Program	B.1.4	existing
5)	BWR Stress Corrosion Cracking Program	B.1.5	existing
6)	BWR Vessel ID Attachment Welds Program	B.1.6	existing
7)	BWR Vessel Internals Program	B.1.7	existing
8)	Containment Leak Rate Program	B.1.8	existing

Table B-1
Aging Management Programs (Continued)

9)	Diesel Fuel Monitoring Program	B.1.9	existing
10)	Environmental Qualification (EQ) of Electric Components Program	B.1.10	existing
11)	Fatigue Monitoring Program	B.1.11	existing
12)	Fire Protection—Fire Protection Program	B.1.12.1	existing
13)	Fire Protection—Fire Water System Program	B.1.12.2	existing
14)	Flow-Accelerated Corrosion Program	B.1.13	existing
15)	Heat Exchanger Monitoring Program	B.1.14	new
16)	Inservice Inspection—Containment Inservice Inspection (CII) Program	B.1.15.1	existing
17)	Inservice Inspection—Inservice Inspection (ISI) Program	B.1.15.2	existing
18)	Instrument Air Quality Program	B.1.16	existing
20)	Non-EQ Inaccessible Medium-Voltage Cable Program	B.1.17	new
21)	Non-EQ Instrumentation Circuits Test Review Program	B.1.18	new
22)	Non-EQ Insulated Cables and Connections Program	B.1.19	new
23)	Oil Analysis Program	B.1.20	existing
24)	One-Time Inspection Program	B.1.21	new
25)	Periodic Surveillance and Preventive Maintenance Program	B.1.22	existing
26)	Reactor Head Closure Studs Program	B.1.23	existing
27)	Reactor Vessel Surveillance Program	B.1.24	existing
28)	Selective Leaching Program	B.1.25	new

Table B-1
Aging Management Programs (Continued)

29)	Service Water Integrity Program	B.1.26	existing
30)	Structures Monitoring— Masonry Wall Program	B.1.27.1	existing
31)	Structures Monitoring— Structures Monitoring Program	B.1.27.2	existing
32)	Structures Monitoring— Vernon Dam FERC Inspection	B.1.27.3	existing
33)	System Walkdown Program	B.1.28	existing
34)	Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program	B.1.29	new
35)	Water Chemistry Control—Auxiliary Systems Program	B.1.30.1	existing
36)	Water Chemistry Control—BWR Program	B.1.30.2	existing
37)	Water Chemistry Control—Closed Cooling Water Program	B.1.30.3	existing

B.0.6 CORRELATION WITH NUREG-1801 AGING MANAGEMENT PROGRAMS

The correlation between NUREG-1801 programs and VYNPS programs is shown below. For the VYNPS programs, links to appropriate sections of this appendix are provided.

Table B-2
VYNPS AMP Correlation with NUREG-1801 Programs

NUREG-1801 Number	NUREG-1801 Program	VYNPS Program
X.E1	Environmental Qualification (EQ) of Electric Components	Environmental Qualification (EQ) of Electric Components Program [B.1.10]
X.M1	Metal Fatigue of Reactor Coolant Pressure Boundary	Fatigue Monitoring Program [B.1.11]
X.S1	Concrete Containment Tendon Prestress	Not applicable
XI.M1	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD	See plant-specific Inservice Inspection—Inservice Inspection (ISI) Program [B.1.15.2]
XI.M2	Water Chemistry	Water Chemistry Control—BWR Program [B.1.30.2]
XI.M3	Reactor Head Closure Studs	Reactor Head Closure Studs Program [B.1.23]
XI.M4	BWR Vessel ID Attachment Welds	BWR Vessel ID Attachment Welds Program [B.1.6]
XI.M5	BWR Feedwater Nozzle	BWR Feedwater Nozzle Program [B.1.3]
XI.M6	BWR Control Rod Drive Return Line Nozzle	BWR CRD Return Line Nozzle Program [B.1.2]
XI.M7	BWR Stress Corrosion Cracking	BWR Stress Corrosion Cracking Program [B.1.5]
XI.M8	BWR Penetrations	BWR Penetrations Program [B.1.4]
XI.M9	BWR Vessel Internals	BWR Vessel Internals Program [B.1.7]

Table B-2
VYNPS AMP Correlation with NUREG-1801 Programs (Continued)

NUREG-1801 Number	NUREG-1801 Program	VYNPS Program
XI.M10	Boric Acid Corrosion	Not applicable
XI.M11	Nickel-Alloy Nozzles and Penetrations	Not applicable
XI.M11A	Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors	Not applicable
XI.M12	Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)	Not applicable
XI.M13	Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS)	Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program [B.1.29]
XI.M14	Loose Part Monitoring	Not applicable
XI.M15	Neutron Noise Monitoring	Not applicable
XI.M16	PWR Vessel Internals	Not applicable
XI.M17	Flow-Accelerated Corrosion	Flow-Accelerated Corrosion Program [B.1.13]
XI.M18	Bolting Integrity	Not applicable
XI.M19	Steam Generator Tube Integrity	Not applicable
XI.M20	Open-Cycle Cooling Water System	Service Water Integrity Program [B.1.26]
XI.M21	Closed-Cycle Cooling Water System	Water Chemistry Control—Closed Cooling Water Program [B.1.30.3]
XI.M22	Boraflex Monitoring	Not applicable

Table B-2
VYNPS AMP Correlation with NUREG-1801 Programs (Continued)

NUREG-1801 Number	NUREG-1801 Program	VYNPS Program
XI.M23	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems	Not applicable
XI.M24	Compressed Air Monitoring	Not applicable
XI.M25	BWR Reactor Water Cleanup System	Not applicable
XI.M26	Fire Protection	Fire Protection Program [B.1.12.1]
XI.M27	Fire Water System	Fire Water System Program [B.1.12.2]
XI.M28	Buried Piping and Tanks Surveillance	Not applicable
XI.M29	Aboveground Steel Tanks	Not applicable
XI.M30	Fuel Oil Chemistry	Diesel Fuel Monitoring Program [B.1.9]
XI.M31	Reactor Vessel Surveillance	Reactor Vessel Surveillance Program [B.1.24]
XI.M32	One-Time Inspection	One-Time Inspection Program [B.1.21]
XI.M33	Selective Leaching of Materials	Selective Leaching Program [B.1.25]
XI.M34	Buried Piping and Tanks Inspection	Buried Piping Inspection Program [B.1.1]
XI.M35	One-time Inspection of ASME Code Class 1 Small-Bore Piping	One-Time Inspection Program [B.1.21]
XI.M36	External Surfaces Monitoring	System Walkdown Program [B.1.28]
XI.M37	Flux Thimble Tube Inspection	Not applicable

Table B-2
VYNPS AMP Correlation with NUREG-1801 Programs (Continued)

NUREG-1801 Number	NUREG-1801 Program	VYNPS Program
XI.M38	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components	Not applicable
XI.M39	Lubricating Oil Analysis	Oil Analysis Program [B.1.20]
XI.E1	Electrical Cables and Connections Not Subject to 10CFR50.49 Environmental Qualification Requirements	Non-EQ Insulated Cables and Connections Program [B.1.19]
XI.E2	Electrical Cables and Connections Not Subject to 10CFR50.49 Environmental Qualification Requirements Used in Instrumentation Circuits	Non-EQ Instrumentation Circuits Test Review Program [B.1.18]
XI.E3	Inaccessible Medium-Voltage Cables Not Subject to 10CFR50.49 Environmental Qualification Requirements	Non-EQ Inaccessible Medium-Voltage Cable Program [B.1.17]
XI.E4	Metal Enclosed Bus	Not applicable
XI.E5	Fuse Holders	Not applicable
XI.E6	Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Not applicable
XI.S1	ASME Section XI, Subsection IWE	See plant-specific Inservice Inspection —Containment Inservice Inspection (CII) Program [B.1.15.1]

Table B-2
VYNPS AMP Correlation with NUREG-1801 Programs (Continued)

NUREG-1801 Number	NUREG-1801 Program	VYNPS Program
XI.S2	ASME Section XI, Subsection IWL	Not applicable
XI.S3	ASME Section XI, Subsection IWF	See plant-specific Inservice Inspection—Inservice Inspection (ISI) Program [B.1.15.2]
XI.S4	10 CFR 50, Appendix J	Containment Leak Rate Program [B.1.8]
XI.S5	Masonry Wall Program	Structures Monitoring—Masonry Wall Program [B.1.27.1]
XI.S6	Structures Monitoring Program	Structures Monitoring—Structures Monitoring Program [B.1.27.2]
XI.S7	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants	Not applicable
XI.S8	Protective Coating Monitoring and Maintenance Program	Not applicable
Plant-Specific Programs		
NA	Plant-specific program	Heat Exchanger Monitoring Program [B.1.14]
NA	Plant-specific program	Inservice Inspection—Containment Inservice Inspection (CII) Program [B.1.15.1]
NA	Plant-specific program	Inservice Inspection—Inservice Inspection (ISI) Program [B.1.15.2]
NA	Plant-specific program	Instrument Air Quality Program [B.1.16]

Table B-2
VYNPS AMP Correlation with NUREG-1801 Programs (Continued)

NUREG-1801 Number	NUREG-1801 Program	VYNPS Program
NA	Plant-specific program	Periodic Surveillance and Preventive Maintenance Program [B.1.22]
NA	Plant-specific program	Structures Monitoring—Vernon Dam FERC Inspection [B.1.27.3]
NA	Plant-specific program	Water Chemistry Control—Auxiliary Systems Program [B.1.30.1]

VYNPS programs have been compared to the NUREG-1801 programs with the results being shown in Table B-3 as

- programs consistent with NUREG-1801;
- programs with enhancements;
- programs with exceptions to NUREG-1801;
- not comparable to NUREG-1801 (plant-specific).

Table B-3
VYNPS Program Consistency with NUREG-1801

Program Name	Plant-Specific	NUREG-1801 Comparison		
		Programs Consistent with NUREG-1801	Programs with Enhancements	Programs with Exceptions to NUREG-1801
Buried Piping Inspection Program			X	X
BWR CRD Return Line Nozzle Program				X
BWR Feedwater Nozzle Program				X
BWR Penetrations Program				X

Table B-3
VYNPS Program Consistency with NUREG-1801

Program Name	Plant-Specific	NUREG-1801 Comparison		
		Programs Consistent with NUREG-1801	Programs with Enhancements	Programs with Exceptions to NUREG-1801
BWR Stress Corrosion Cracking Program				X
BWR Vessel ID Attachment Welds Program				X
BWR Vessel Internals Program			X	X
Containment Leak Rate Program				X
Diesel Fuel Monitoring Program			X	X
Environmental Qualification (EQ) of Electric Components Program		X		
Fatigue Monitoring Program			X	X
Fire Protection—Fire Protection Program			X	X
Fire Protection—Fire Water System Program			X	X
Flow-Accelerated Corrosion Program		X		
Heat Exchanger Monitoring Program	X			
Inservice Inspection—Containment Inservice Inspection (CII) Program	X			
Inservice Inspection—Inservice Inspection (ISI) Program	X			

Table B-3
VYNPS Program Consistency with NUREG-1801

Program Name	Plant-Specific	NUREG-1801 Comparison		
		Programs Consistent with NUREG-1801	Programs with Enhancements	Programs with Exceptions to NUREG-1801
Instrument Air Quality Program	X			
Non-EQ Inaccessible Medium-Voltage Cable Program		X		
Non-EQ Instrumentation Circuits Test Review Program		X		
Non-EQ Insulated Cables and Connections Program		X		
Oil Analysis Program				X
One-Time Inspection Program		X		
Periodic Surveillance and Preventive Maintenance Program	X			
Reactor Head Closure Studs Program				X
Reactor Vessel Surveillance Program		X	X	
Selective Leaching Program		X		
Service Water Integrity Program				X
Structures Monitoring—Masonry Wall Program		X		
Structures Monitoring—Structures Monitoring Program		X	X	

Table B-3
VYNPS Program Consistency with NUREG-1801

Program Name	Plant-Specific	NUREG-1801 Comparison		
		Programs Consistent with NUREG-1801	Programs with Enhancements	Programs with Exceptions to NUREG-1801
Structures Monitoring—Vernon Dam FERC Inspection	X			
System Walkdown Program		X		
Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program		X		
Water Chemistry Control—Auxiliary Systems Program	X			
Water Chemistry Control—BWR Program		X		
Water Chemistry Control—Closed Cooling Water Program				X

B.1 AGING MANAGEMENT PROGRAMS AND ACTIVITIES

B.1.1 BURIED PIPING INSPECTION

Program Description

The Buried Piping Inspection Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.M34, Buried Piping and Tanks Inspection.

This program includes (a) preventive measures to mitigate corrosion and (b) inspections to manage the effects of corrosion on the pressure-retaining capability of buried carbon steel, stainless steel, and gray cast iron components. Preventive measures are in accordance with standard industry practice for maintaining external coatings and wrappings. Buried components are inspected when excavated during maintenance.

Prior to entering the period of extended operation, plant operating experience will be reviewed to verify that an inspection occurred within the past ten years. A focused inspection will be performed within the first 10 years of the period of extended operation, unless an opportunistic inspection (or an inspection via a method that allows an assessment of pipe condition without excavation) occurs within this ten-year period.

NUREG-1801 Consistency

The Buried Piping Inspection Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M34, Buried Piping and Tanks Inspection, with exceptions and an enhancement.

Exceptions to NUREG-1801

The Buried Piping Inspection Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M34, Buried Piping and Tanks Inspection, with the following exceptions and enhancement.

Attributes Affected	Exceptions
1. Scope of Program	NUREG-1801 refers to buried steel piping and tanks. The VYNPS program does not inspect tanks.[1]
4. Detection of Aging Effects	Inspections via methods that allow assessment of pipe condition without excavation may be substituted for inspections requiring excavation solely for the purpose of inspection.[2]

Exception Notes

1. There are no buried steel tanks subject to aging management review.
2. Methods such as phased array UT technology provide indication of wall thickness for buried piping without excavation. Use of such methods to identify the effects of aging is preferable to excavation for visual inspection, which could result in damage to coatings or wrappings.

Enhancements

The following enhancement will be initiated prior to the period of extended operation.

Attributes Affected	Enhancement
3.Parameters Monitored/Inspected	Guidance for performing examinations of buried piping will be enhanced to specify that coating degradation and corrosion are attributes to be evaluated.

Operating Experience

Steel piping was excavated and inspected on several occasions during the past seven years. These inspections did not reveal loss of material due to external surface corrosion. Therefore, this OE provides evidence that the program manages loss of material caused by corrosion of the external surfaces of buried components.

Conclusion

The Buried Piping Inspection Program has been effective at managing aging effects. It provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.2 BWR CRD RETURN LINE NOZZLE

Program Description

The BWR Control Rod Drive (CRD) Return Line Nozzle Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.M6, BWR Control Rod Drive Return Line Nozzle.

Under this program, VYNPS has rerouted the CRD return flow to the reactor water cleanup (RWCU) system, with the rerouted line flow valved open, and capped the CRD return line vessel nozzle to mitigate cracking. Continuing Inservice Inspection (ISI) examinations monitor the effects of crack initiation and growth on the intended function of the control rod drive return line nozzle and cap.

NUREG-1801 Consistency

The BWR CRD Return Line Nozzle Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M6, BWR Control Rod Drive Return Line Nozzle, with an exception.

Exceptions to NUREG-1801

The BWR CRD Return Line Nozzle Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M6, BWR Control Rod Drive Return Line Nozzle, with the following exception.

Attributes Affected	Exception
3. Parameters Monitored/Inspected 4. Detection of Aging Effects 5. Monitoring and Trending	VYNPS does not inspect the welded connection between the CRD return line and the RWCU system piping during each refueling outage.[1]

Exception Note

1. In its safety evaluation of BWR feedwater and CRD return line modifications at VYNPS, NRC accepted VYNPS' commitment to inspect the CRD return line to RWCU joint, by UT methods, for three consecutive refuel outages, then reassess the inspection frequency based upon the inspection results. Inspection of the three CRD return line to RWCU welds confirmed there were no indications and reassessment concluded that further inspections are not required. It is reasonable to maintain this exception for the period of extended operation since the CRD return line now ties into the RWCU system in a section of piping that is nonsafety-related and not subject to aging management review as it has no license renewal function.

Enhancements

None

Operating Experience

CRD return line nozzle ultrasonic examination in October, 2002 found no indications of cracking.

Conclusion

The BWR CRD Return Line Nozzle Program has been effective at managing aging effects. The BWR CRD Return Line Nozzle Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.3 BWR FEEDWATER NOZZLE

Program Description

The BWR Feedwater Nozzle Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.M5, BWR Feedwater Nozzle.

Under this program, VYNPS has replaced the original low flow control valve with a drag type valve having improved flow characteristics, replaced the feedwater spargers with interference-fit thermal sleeve spargers, and installed a thermal sleeve bypass leak detection system to mitigate cracking. This program continues enhanced inservice inspection (ISI) of the feedwater nozzles in accordance with the requirements of ASME Section XI, Subsection IWB and the recommendation of General Electric (GE) NE-523-A71-0594 to monitor the effects of cracking on the intended function of the feedwater nozzles.

NUREG-1801 Consistency

The BWR Feedwater Nozzle Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M5, BWR Feedwater Nozzle, with one exception.

Exceptions to NUREG-1801

The BWR Feedwater Nozzle Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M5, BWR Feedwater Nozzle, with the following exception.

Attributes Affected	Exception
2. Preventive Actions	Stainless steel cladding was not removed, a low-flow controller was not installed and the reactor water cleanup system was not rerouted.[1]

Exception Note

1. In its safety evaluation of BWR feedwater and CRD return line modifications at VYNPS, NRC noted that the intent of the requirements of NUREG-0619 and NEDE-21821-A had been satisfied with the VYNPS modifications. Since liquid penetrant inspection of the nozzles revealed no cracks and a thermal sleeve bypass leak detection system has been installed, an adequate margin of safety against feedwater nozzle crack growth exists. Therefore, NRC concluded that, with continued inspections to monitor for crack initiation and growth, VYNPS can operate without rerouting the RWCU, without removing the clad, and without installing a low-flow controller for the feedwater system. Since inspections to monitor for crack initiation and growth will continue, this conclusion remains valid for the period of extended operation.

Enhancements

None

Operating Experience

Inspections performed following feedwater system modifications show no new cracking of the feedwater nozzle. Inspection results indicate that plant modifications to reduce thermal stresses have been effective in resolving the feedwater nozzle cracking issue.

Ultrasonic testing of the feedwater nozzle in October, 2002 resulted in no recordable indications. Absence of recordable indications on the feedwater nozzle provides evidence that the program is effective for managing cracking of the feedwater nozzle.

QA assessments in 2002 and 2004 revealed no issues or findings that could impact effectiveness of the program.

Conclusion

The BWR Feedwater Nozzle Program has been effective at managing aging effects. The BWR Feedwater Nozzle Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.4 BWR PENETRATIONS

Program Description

The BWR Penetrations Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.M8, BWR Penetrations.

The program includes (a) inspection and flaw evaluation in conformance with the guidelines of staff-approved boiling water reactor vessel and internals project (BWRVIP) documents BWRVIP-27 and BWRVIP-49 and (b) monitoring and control of reactor coolant water chemistry in accordance with the guidelines of BWRVIP-130 to ensure the long-term integrity of vessel penetrations and nozzles.

NUREG-1801 Consistency

The BWR Penetrations Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M8, BWR Penetrations, with exceptions.

Exceptions to NUREG-1801

The BWR Penetrations Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M8, BWR Penetrations, with the following exceptions.

Attributes Affected	Exceptions
3. Parameters Monitored/Inspected 4. Detection of Aging Effects	Table IWB-2500-1 from the 1998 edition with 2000 addenda of ASME Section XI is used to specify SLC nozzle inspections, while NUREG-1801 specifies the 2001 edition with 2002 and 2003 addenda.[1]
4. Detection of Aging Effects	VYNPS examines ½ inch of the volume next to the widest part of the N10 nozzle to vessel weld, rather than half of the vessel wall thickness.[2]

Exception Notes

1. Since ASME Section XI through the 2003 Addenda has been accept by reference in 10CFR50.55a paragraph (b) (2) without modification or limitation on use of Table IWB-2500-1 from the 1998 edition with 2000 addenda for BWR components, use of this version is appropriate to assure that components crediting this program can perform their intended function consistent with the current licensing basis during the period of extended operation.

2. Extending the examination volume into the base metal as required by ASME Section XI, 1998 Edition, 2000 Addenda, Figure IWB-2500-7(b) prolongs the examination time significantly and results in no net increase in safety. The extra volume is base metal region which is not prone to in-service cracking and has been extensively examined before the vessel was put into service and during the first, second and third interval examinations.

Enhancements

None

Operating Experience

Enhanced leakage inspection (with insulation removed) of the SLC nozzle in October, 2002 resulted in no recordable indications. Absence of recordable indications on the SLC nozzle provides evidence that the program is effective for managing cracking of the SLC nozzle.

Liquid penetrant examination of instrument penetration nozzles in May, 2001 resulted in no recordable indications. Absence of recordable indications on the instrument nozzles provides evidence that the program is effective for managing cracking of the instrument penetration nozzles.

As a participant in the BWRVIP, VYNPS is committed to incorporate lessons learned from operating experience of the entire BWR fleet, not just that of VYNPS. BWRVIP inspection criteria and industry OE are evaluated to determine whether the existing program should be modified.

Conclusion

The BWR Penetrations Program has been effective at managing aging effects. The BWR Penetrations Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.5 BWR STRESS CORROSION CRACKING

Program Description

The BWR Stress Corrosion Cracking Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.M7, BWR Stress Corrosion Cracking.

The program includes (a) preventive measures to mitigate intergranular stress corrosion cracking (IGSCC), and (b) inspection and flaw evaluation to monitor IGSCC and its effects on reactor coolant pressure boundary components made of stainless steel, CASS, or nickel alloy.

NUREG-1801 Consistency

The BWR Stress Corrosion Cracking Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M7, BWR Stress Corrosion Cracking, with an exception.

Exceptions to NUREG-1801

The BWR Stress Corrosion Cracking Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M7, BWR Stress Corrosion Cracking, with the following exception.

Attributes Affected	Exception
6. Acceptance Criteria	The 1998 edition with 2000 addenda of ASME Section XI, Subsection IWB-3600 is used for flaw evaluation, while NUREG-1801 specifies the 1986 edition of ASME Section XI, Subsection IWB-3600 for flaw evaluation.[1]

Exception Note

1. Since ASME Section XI through the 2003 Addenda has been accept by NRC in 10CFR50.55a paragraph (b) (2) without modification or limitation on use of subsection IWB-3600 from the 1998 edition with 2000 addenda, use of this version for flaw evaluation is appropriate to assure that components crediting this program can perform their intended function consistent with the current licensing basis during the period of extended operation.

Enhancements

None

Operating Experience

Liquid penetrant and ultrasonic examinations of GL 88-01 nozzle safe end welds in May, 2001 and October, 2002 resulted in no recordable indications. Absence of recordable indications on the nozzle safe end welds provides evidence that the program is effective for managing cracking of austenitic stainless steel piping and components.

Preventative measures for mitigation of cracking, including replacement and modification of austenitic piping and components have been approved by NRC as part of an effective stress corrosion cracking mitigation strategy.

QA assessment in 2001 revealed no issues or findings that could impact effectiveness of the program.

Conclusion

The BWR Stress Corrosion Cracking Program has been effective at managing aging effects. The BWR Stress Corrosion Cracking Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.6 BWR VESSEL ID ATTACHMENT WELDS

Program Description

The BWR Vessel ID Attachment Welds Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.M4, BWR Vessel ID Attachment Welds.

The program includes (a) inspection and flaw evaluation in accordance with the guidelines of staff-approved boiling water reactor vessel and internals project (BWRVIP) BWRVIP-48 and (b) monitoring and control of reactor coolant water chemistry in accordance with the guidelines of BWRVIP-130 (EPRI Report 1008192) to ensure the long-term integrity and safe operation of reactor vessel inside diameter (ID) attachment welds and support pads.

NUREG-1801 Consistency

The BWR Vessel ID Attachment Welds Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M4, BWR Vessel ID Attachment Welds, with an exception.

Exceptions to NUREG-1801

The BWR Vessel ID Attachment Welds Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M4, BWR Vessel ID Attachment Welds, with the following exception.

Attributes Affected	Exception
3. Parameters Monitored/Inspected	Table IWB-2500-1 from the 1998 edition with 2000 addenda of ASME Section XI is used, while NUREG-1801 specifies the 2001 edition with 2002 and 2003 addenda.[1] (Note 1)

Exception Note

1. Since ASME Section XI through the 2003 Addenda has been accept by reference in 10CFR50.55a paragraph (b) (2) without modification or limitation on use of Table IWB-2500-1 from the 1998 edition with 2000 addenda for BWR components, use of this version is appropriate to assure that components crediting this program can perform their intended function consistent with the current licensing basis during the period of extended operation.

Enhancements

None

Operating Experience

Visual inspections of vessel ID attachment welds in October, 2002 resulted in no recordable indications. Absence of recordable indications on vessel attachment welds provides evidence that the program is effective for managing cracking of vessel attachment welds.

NRC inspections in 2002 and 2004 and a self-assessment in 2002 revealed no issues or findings that could impact effectiveness of the program.

Conclusion

The BWR Vessel ID Attachment Welds Program has been effective at managing aging effects. The BWR Vessel ID Attachment Welds Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.7 BWR VESSEL INTERNALS

Program Description

The BWR Vessel Internals Program at VYNPS is comparable to the program described in NUREG-1801, Section XI. M9, BWR Vessel Internals.

The program includes (a) inspection, flaw evaluation, and repair in conformance with the applicable, staff-approved, industry BWR Vessel and Internals Project (BWRVIP) documents, and (b) monitoring and control of reactor coolant water chemistry in accordance with the guidelines of BWRVIP-130 to ensure the long-term integrity of vessel internal components.

NUREG-1801 Consistency

The BWR Vessel Internals Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M9, BWR Vessel Internals with exceptions and an enhancement.

Exceptions to NUREG-1801

The BWR Vessel Internals Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M9, BWR Vessel Internals with the following exceptions.

Attributes Affected	Exceptions
1. Scope of Program 4. Detection of Aging Effects	**Core Shroud** For shroud horizontal welds H1, H2 and H3, VYNPS inspects 18 inches in length in each of the four quadrants from the outside diameter using EVT-1 methods. If cracks are found in a quadrant, the length is expanded in that quadrant to detect 18 inches of unflawed weld. Thus, VYNPS does not meet the BWRVIP-76 requirement to inspect both the outside and inside diameter of the welds and does not meet the requirement to inspect 100% of the length of the welds.[1]

1. Scope of Program 4. Detection of Aging Effects	**Core Plate** VYNPS performs VT-3 inspection of 50% (15) of the top of the core plate rim hold-down bolts every other refueling outage. If access to the lower plenum becomes available, VYNPS plans to perform a VT-3 inspection of accessible rim hold-down bolt bottom locking engagement and accessible aligner pin assemblies. Thus, VYNPS does not meet the BWRVIP-25 requirement to perform enhanced VT-1 from below the core plate of 50% of the hold-down bolts.[2]
1. Scope of Program 4. Detection of Aging Effects	**Core Spray** VYNPS defers inspection of the three inaccessible welds inside each of the two core spray nozzles, and the P9 welds inside the core spray shroud collars, until a delivery system for ultrasonic testing of the hidden welds is developed. Thus, VYNPS does not meet the BWRVIP-18 requirement to perform an ultrasonic inspection of a full target weld set every other refueling outage.[3]
1. Scope of Program 4. Detection of Aging Effects	**Jet Pump Assembly** VYNPS uses EVT-1 inspection of six jet pump welds with UT indications. Thus, VYNPS does not meet guidance implied in BWRVIP-41 that when flaws are identified, subsequent examinations should use the same technique that originally found the flaw.[4] VYNPS defers inspection of jet pump inaccessible welds, until a delivery system for ultrasonic testing of the hidden welds is developed. Thus, VYNPS does not meet the BWRVIP-41 requirement to perform a modified VT-1 of 100% of these welds over two 6-year inspection cycles and 25% per inspection cycle thereafter.[3]

1. Scope of Program 4. Detection of Aging Effects	**Control Rod Drive Housing** VYNPS performed less than 5% of the CRD guide tube weld exams within the first six-year interval. Thus, VYNPS does not meet the BWRVIP-47 requirement to inspect 5% of the CRD guide tube welds within the first six years.[5]
3. Parameters Monitored/Inspected	Table IWB-2500-1 from the 1998 edition with 2000 addenda of ASME Section XI is used, while NUREG-1801 specifies the 2001 edition with 2002 and 2003 addenda.[6]

Exception Notes

1. The core spray spargers cover H1 and H2, and grating covers the periphery of the top guide. Therefore, access to the shroud inside diameter would be through vacated fuel cells, which would result in the camera being too distant from the inspection surfaces to perform an adequate EVT-1 of H1, H2, or H3. Although no BWRVIP guidance is given for one-sided visual examinations of horizontal welds, they are inspected on a six-year frequency following the BWRVIP guidance for a one-sided EVT-1 of vertical welds. The excellent results obtained in the 1995 ultrasonic examination of welds H1, H2, and H3 (very limited indications) and the 1996 ultrasonic examination of the vertical and ring segment welds (no indications) provide additional assurance that a one sided EVT-1 is acceptable.
2. A baseline VT-3 examination of the tops of all 30 bolted connections was performed in 1996. Follow-up VT-3 examinations of tops of 50% of the bolted connections were performed in 1999, 2000 and 2001. None of the exams found evidence of cracking or bolting disassembly. Since the lower bolted connections are similar to the top, and there are no failed connections in the sample that is inspected, it is unlikely that a significant number of failed connections could exist in the remainder of the population. Therefore, the VYNPS inspection plan is adequate for ensuring the structural integrity of the core plate configuration to resist sliding against shear loads.

3. The three core spray thermal sleeve welds in each of the two core spray nozzles are full penetration butt welds, which decreases the likelihood of cracking. Inspection of similar core spray piping welds, such as junction box-to-pipe and upper elbow welds, showed no indication of cracking. Integrity of the P9 welds must be considered because indications have been recorded during ultrasonic examination of collar-to-shroud welds at VYNPS. The P9 welds are creviced. All other creviced core spray welds at VYNPS – the junction box cover plate welds, P1 welds and downcomer sleeve welds – show no indications of cracking. The hidden jet pump welds are far enough into the nozzle that failure at these welds would not result in the thermal sleeve disengaging from the nozzle before the riser contacted the shroud. If the jet pump thermal sleeve or riser piping severed, it would be detected through jet pump monitoring, which alarms if the riser pipe moves more than 10% while at or above a core flow of 42 Mlb/hr. Therefore, deferral of inspection of the inaccessible welds is justified.

4. For jet pump welds, BWRVIP-41 finds EVT-1 or UT to be acceptable examination techniques. In 1996, VYNPS performed UT examinations and recorded indications in six jet pump welds. All six welds were reinspected by UT after two cycles of operation and there were no new indications or growth of existing indications. Since the reinspection demonstrated that there is no active cracking in these welds, and EVT-1 inspection will reveal cracking prior to encroachment on the weld structural integrity limit, performing subsequent inspections using the EVT-1 technique is acceptable. VYNPS will perform the EVT-1 inspections every two cycles until three successive inspections confirm no new indications or growth of existing indications, at which time VYNPS will revert to the six-year inspection interval specified in BWRVIP-41.

5. To meet the BWRVIP-47 requirement to inspect 5% of the CRD guide tube welds within the first six years, VYNPS would have to inspect five guide tubes. Four CRD guide tube assemblies were inspected during the first six-year period, for a total of 4.5% of the welds. The inspections began in RFO 22 (2001), when four guide tube assemblies were inspected, and were expected to be completed during RFO 23 (2002). Control blade change-out allows access to the interior of the CRD guide tube and, typically, there are between three and ten blade change-outs each outage. However, no control blades were changed during RFO 23. Inspecting one guide tube during RFO 23 to attain the 5% sample level would have required vacating an additional fuel cell (more fuel moves) and an added three hours for disassembly and reassembly (not counting inspection time). This hardship is not justified in terms of safety in order to raise the inspection sample from 4.5% to 5%. The BWRVIP-47 requirement to inspect 10% of the CRD guide tubes over the first twelve years will be met.

6. Since ASME Section XI through the 2003 Addenda has been accept by reference in 10CFR50.55a paragraph (b) (2) without modification or limitation on use of Table IWB-2500-1 from the 1998 edition with 2000 addenda for BWR components, use of this version is appropriate to assure that components crediting this program can perform their intended function consistent with the current licensing basis during the period of extended operation.

Enhancements

The following enhancement will be initiated prior to the period of extended operation.

Attributes Affected	Enhancement
1. Scope of Program	The VYNPS top guide fluence is projected to exceed the threshold for IASCC ($5x10^{20}$ n/cm^2) prior to the period of extended operation. Therefore, ten (10) percent of the top guide locations will be inspected using enhanced visual inspection technique, EVT-1, within the first 12 years of the period of extended operation, with one-half of the inspections (50 percent of locations) to be completed within the first 6 years of the period of extended operation. Locations selected for examination will be areas that have exceeded the neutron fluence threshold.

Operating Experience

Cracking of jet pump riser welding (RS-1) was discovered during 1998 inspections. Subsequent inspection showed no new indications or growth of existing indications. Also, potential core spray piping weld flaws were identified during ultrasonic examination in 2001. Indications were evaluated in accordance with BWRVIP-18 evaluation criteria and found to be acceptable. This OE provides evidence that the program is effective at managing the effects of cracking on the intended function of applicable components.

Visual inspections of reactor vessel internals in 2004 revealed no new age-related indications. Absence of new indications provides evidence that the program is effective at managing the effects of aging on the intended function of applicable components.

NRC inspections, self-assessments, QA audits, and evaluations of industry OE from 1999 through 2004 revealed no issues or findings that could impact effectiveness of the program.

Conclusion

The BWR Vessel Internals Program has been effective at managing aging effects. The BWR Vessel Internals Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.8 CONTAINMENT LEAK RATE

Program Description

The Containment Leak Rate Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.S4, 10 CFR 50, Appendix J.

As described in 10 CFR Part 50, Appendix J, containment leak rate tests are required to assure that (a) leakage through primary reactor containment and systems and components penetrating primary containment shall not exceed allowable values specified in technical specifications or associated bases and (b) periodic surveillance of reactor containment penetrations and isolation valves is performed so that proper maintenance and repairs are made during the service life of containment, and systems and components penetrating primary containment.

NUREG-1801 Consistency

The Containment Leak Rate Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.S4, 10 CFR Part 50, Appendix J, with one exception.

Exceptions to NUREG-1801

The Containment Leak Rate Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.S4, 10 CFR Part 50, Appendix J, with the following exception.

Attributes Affected	Exception
5. Monitoring and Trending	The first Type A test after the April 1995 Type A test shall be performed no later than April 2010. This is a one-time extension of the NEI 94-01, 10 year Type A test interval to 15 years.[1]

Exception Note

1. NRC approved Amendment 227 to Facility Operating License DPR-28 for VYNPS to extend the primary containment integrated leak rate testing interval from 10 years to no longer than 15 years on a one-time basis.

Enhancements

None

Operating Experience

During the most recent integrated leakage testing of primary containment, as-found and as-left test data met all applicable test acceptance criteria, indicating that the program is effective at managing the effects of loss of material and cracking on primary containment components.

A QA audit in 2001 revealed latent noncompliance with station administrative and Appendix J implementing procedures. An administrative procedure noncompliance created the potential for untimely review of industry OE relative to the program. These issues could impact effectiveness of the program. However, actions to preclude recurrence of the identified conditions were established and have been implemented under the corrective action program. Subsequent QA audits, QA surveillances and engineering program health assessments (2003 and 2004) revealed no issues or findings that could impact effectiveness of the program.

Conclusion

The Containment Leak Rate Program has been effective at managing aging effects. The Containment Leak Rate Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.9 DIESEL FUEL MONITORING

Program Description

The Diesel Fuel Monitoring Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.M30, Fuel Oil Chemistry Program.

The program entails sampling to ensure that adequate diesel fuel quality is maintained to prevent corrosion of fuel systems. Exposure to fuel oil contaminants such as water and microbiological organisms is minimized by periodic draining and cleaning of tanks and by verifying the quality of new oil before its introduction into storage tanks. Sampling and analysis activities are in accordance with technical specifications on fuel oil purity and the guidelines of ASTM standards D4057-88 and D975-02 (or later revisions of these standards).

NUREG-1801 Consistency

The Diesel Fuel Monitoring Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M30, Fuel Oil Chemistry Program, with exceptions and enhancements.

Exceptions to NUREG-1801

The Diesel Fuel Monitoring Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M30, Fuel Oil Chemistry Program, with the following exceptions.

Attributes Affected	Exceptions
1. Scope of Program 6. Acceptance Criteria	The guidelines of ASTM Standard D6217 are not used along with those of D2276 for determination of particulates.[1]
2. Preventive Actions	No additives are used beyond what the refiner adds during production.[2]
3. Parameters Monitored / Inspected 6. Acceptance Criteria	Only ASTM Standard D1796 is used for determination of water and sediment, rather than Standards D1796 and D2709.[3]
3. Parameters Monitored / Inspected 6. Acceptance Criteria	Determination of particulates may be according to ASTM Standard D2276, rather than modified ASTM D2276 Method A.[4]

Exception Notes

1. VYNPS technical specifications specify use of ASTM D975-02, which recommends use of ASTM D2276. Therefore, the guidelines of D2276 are appropriate for determination of particulates.
2. VYNPS does not add biocides, stabilizers, or corrosion inhibitors to the diesel fuel. Plant-specific operating experience has not indicated significant problems related to MIC. Since water contamination in the diesel fuel storage tanks is minimized, the potential for MIC is limited.
3. NUREG-1801 states that ASTM Standards D1796 and D2709 are used for determination of water and sediment. However, these standards describe the determination of water and sediment for oils with different viscosities. Either standard is applicable to the #2 diesel fuel oil used at VYNPS. VYNPS uses ASTM Standard D1796 for determination of water and sediment.
4. Determination of particulates may be according to ASTM Standard D2276 which conducts particulate analysis using a 0.8 micron filter, rather than the 3.0 micron filter specified in NUREG-1801. Use of a filter with a smaller pore size results in a larger sample of particulates since smaller particles are retained. Thus, use of a 0.8 micron filter is more conservative than use of the 3.0 micron filter specified in NUREG-1801.

Enhancements

The following enhancements will be initiated prior to the period of extended operation.

Attributes Affected	Enhancement
4. Detection of Aging Effects	Ultrasonic thickness measurement of the tank bottom surface will be performed every 10 years during tank cleaning and inspection.
6. Acceptance Criteria	UT measurements of TK-40-1A bottom surface will have acceptance criterion 60% Tnom.

Operating Experience

Fuel oil sampling results from 2000, 2001, 2002, and 2003 reveal that fuel oil quality is being maintained in compliance with acceptance criteria. A 1996 visual inspection of the fuel oil storage tank internals revealed no degradation. Also, a 1996 ultrasonic thickness measurement of the tank bottom surface revealed no significant degradation. Continuous confirmation of diesel fuel quality and absence of degradation in the fuel oil storage tank provide evidence that the program is effective in precluding loss of material and cracking of fuel system components.

QA surveillance in 1999 revealed an issue that could impact effectiveness of the program. However, corrective action was taken to update the program to the 2002 version of ASTM D975. No other significant findings have been identified.

Conclusion

The Diesel Fuel Monitoring Program has been effective at managing aging effects. The program has been improved through evaluation of site and industry operating experience. The Diesel Fuel Monitoring Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended function consistent with the current licensing basis for the period of extended operation.

B.1.10 ENVIRONMENTAL QUALIFICATION OF ELECTRIC COMPONENTS

Program Description

The Environmental Qualification (EQ) of Electric Components Program at VYNPS is comparable to the program described in NUREG-1801, Section X.E1, Environmental Qualification (EQ) of Electric Components.

The Nuclear Regulatory Commission (NRC) has established nuclear station environmental qualification (EQ) requirements in 10 CFR Part 50, Appendix A, Criterion 4, and 10 CFR 50.49. 10 CFR 50.49 specifically requires that an EQ program be established to demonstrate that certain electrical components located in harsh plant environments (that is, those areas of the plant that could be subject to the harsh environmental effects of a loss of coolant accident [LOCA], high energy line breaks [HELBs] or post-LOCA radiation) are qualified to perform their safety function in those harsh environments. 10 CFR 50.49 requires that the effects of significant aging mechanisms be addressed as part of environmental qualification.

The VYNPS EQ program manages component thermal, radiation, and cyclical aging through the use of aging evaluations based on 10 CFR 50.49(f) qualification methods. As required by 10 CFR 50.49, EQ components not qualified for the current license term are refurbished, replaced, or their qualification extended prior to reaching the aging limits established in the evaluation. Aging evaluations for EQ components are considered time-limited aging analyses (TLAAs) for license renewal.

NUREG-1801 Consistency

The Environmental Qualification (EQ) of Electric Components Program at VYNPS is consistent with the program described in NUREG-1801, Section X.E1, Environmental Qualification (EQ) of Electric Components.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

Licensee Event Report (LER) 97-20 notified the NRC staff of significant program deficiencies including non-conservative analytical methods. Supplementary and confirmatory analyses were completed because conditions in the EQ analyses were determined to be non-conservative.

This OE demonstrates that the corrective action process is used to document program deficiencies and track corrective actions when necessary.

QA audits in 2000 and 2002 identified deficiencies related to maintenance and content of program documentation. However, a 2004 QA audit and engineering program health report determined the program is effective and being administered and maintained in a manner that meets regulatory requirements and commitments.

The VYNPS program is in compliance with 10 CFR 50.49. Therefore, the VYNPS program is effective at managing aging effects for electric components.

Conclusion

The Environmental Qualification (EQ) of Electric Components Program has been effective at managing aging effects. The Environmental Qualification (EQ) of Electric Components Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended function consistent with the current licensing basis for the period of extended operation.

B.1.11 FATIGUE MONITORING

Program Description

The Fatigue Monitoring Program at VYNPS is comparable to the program described in NUREG-1801, Section X.M1, Metal Fatigue of Reactor Coolant Pressure Boundary.

In order not to exceed design limit on fatigue usage, the Fatigue Monitoring Program tracks the number of critical thermal and pressure transients for selected reactor coolant system components. The program ensures the validity of analyses that explicitly assumed a specified number of thermal and pressure fatigue transients by assuring that the actual effective number of transients is not exceeded.

NUREG-1801 Consistency

The Fatigue Monitoring Program at VYNPS is consistent with the program described in NUREG-1801, Section X.M1, Metal Fatigue of Reactor Coolant Pressure Boundary, with exceptions and enhancements.

Exceptions to NUREG-1801

The Fatigue Monitoring Program at VYNPS is consistent with the program described in NUREG-1801, Section X.M1, Metal Fatigue of Reactor Coolant Pressure Boundary, with the following exceptions.

Attributes Affected	Exception
2. Preventive Actions	The Fatigue Monitoring Program only involves tracking the number of transient cycles and does not include assessment of the impact of reactor water environment on critical components.[1]
4. Detection of Aging Effects	The VYNPS program does not provide for periodic update of the fatigue usage calculations.[2]

Exception Notes

1. The effect of the reactor water environment on fatigue is addressed as described in Section 4.3.5

2. Updates of fatigue usage calculations are not necessary unless the number of accumulated fatigue cycles approaches the number of assumed design cycles. The VYNPS program provides for periodic assessment of the number of accumulated cycles. If a design cycle assumption is approached, corrective action is taken which may include update of the fatigue usage calculation.

Enhancements

The following enhancements will be initiated prior to the period of extended operation.

Attributes Affected	Enhancements
4. Detection of Aging Effects	The VYNPS program will be modified to either require periodic update of cumulative fatigue usage factors (CUFs), or to require update of CUFs if the number of accumulated cycles approaches the number assumed in the design calculation.
5. Monitoring and Trending	A computerized monitoring program (e.g., FatiguePro) will be used to directly determine cumulative fatigue usage factors (CUFs) for locations of interest.
6. Acceptance Criteria	The allowable number of effective transients will be established for monitored transients. This will allow quantitative projection of future margin.

Operating Experience

Discovery of a previously unrecognized fatigue cycle applicable to reactor vessel feedwater nozzles was documented using the condition reporting process. Corrective actions included revision of the cycle tracking procedure and revision of feedwater nozzle fatigue analysis calculations. This OE demonstrates that the corrective action process is used to document program deficiencies and track corrective actions when necessary.

For recent reactor shutdowns and startups, cycle limitations did not trend toward exceeding the allowable number of cycles. This OE demonstrates that the program continues to monitor plant transients and track the accumulation of these transients.

Conclusion

The Fatigue Monitoring Program has been demonstrated to maintain the validity of the fatigue design basis for reactor coolant system components designed to withstand the effects of cyclic loads due to reactor system temperature and pressure changes.

The Fatigue Monitoring Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended function consistent with the current licensing basis for the period of extended operation.

B.1.12 FIRE PROTECTION

The fire protection programs for VYNPS include the Fire Protection Program and the Fire Water System Program. These two programs are comparable to NUREG-1801, Section XI.M26, Fire Protection and NUREG-1801, Section XI.M27, Fire Water System, respectively.

The Fire Protection programs are discussed in more detail in the following subsections

Fire Protection

Fire Water System

B.1.12.1 Fire Protection

Program Description

The Fire Protection Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.M26, Fire Protection.

The fire protection program includes a fire barrier inspection and a diesel-driven fire pump inspection. The fire barrier inspection requires periodic visual inspection of fire barrier penetration seals, fire barrier walls, ceilings, and floors, and periodic visual inspection and functional tests of fire rated doors to ensure that their operability is maintained. The diesel-driven fire pump inspection requires that the pump be periodically tested to ensure that the fuel supply line can perform its intended function.

Corrective actions, confirmation process, and administrative controls in accordance with the requirements of 10CFR Part 50 Appendix B are applied to the Fire Protection Program.

NUREG-1801 Consistency

The Fire Protection Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M26, Fire Protection with exceptions and enhancements.

Exceptions to NUREG-1801

The Fire Protection Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M26, Fire Protection with the following exceptions.

Attributes Affected	Exceptions
1. Scope of Program	This program is not necessary to manage aging effects for halon fire protection system components.[1]
4. Detection of Aging Effects	The NUREG-1801 program states that 10% of each type of penetration seal should be visually inspected at least once every refueling outage. The VYNPS program specifies inspection of approximately 25% of the seals (regardless of seal type) each operating cycle, with all accessible fire barrier penetration seals being inspected at least once every four operating cycles.[2]

Exception Notes

1. The Halon 1301 suppression system is not subject to aging management review. Aging effects for components in the CO_2 system are managed by the System Walkdown Program.
2. Since aging effects are typically manifested over several years, this variation in inspection frequency is insignificant.

Enhancements

The following enhancements will be initiated prior to the period of extended operation.

Attributes Affected	Enhancements
3. Parameters Monitored/Inspected 6. Acceptance Criteria	Procedures will be enhanced to specify that fire damper frames in fire barriers shall be inspected for corrosion. Acceptance criteria will be enhanced to verify no significant corrosion.

3. Parameters Monitored/Inspected 6. Acceptance Criteria	Procedures will be enhanced to state that the diesel engine sub-systems (including the fuel supply line) shall be observed while the pump is running. Acceptance criteria will be enhanced to verify that the diesel engine did not exhibit signs of degradation while it was running; such as fuel oil, lube oil, coolant, or exhaust gas leakage.

Operating Experience

Numerous condition reports identifying minor degradation of penetration seals and fire barriers reveal periodic inspections effectively monitor for aging effects requiring management, identify aging effects, and appropriately resolve the conditions.

QA surveillances, QA audits, and NRC integrated and triennial inspections since 1999 revealed no issues or findings that could impact effectiveness of the program.

Conclusion

The Fire Protection Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.12.2 Fire Water System

Program Description

The Fire Water System Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.M27, Fire Water System.

This aging management program applies to water-based fire protection systems that consist of sprinklers, nozzles, fittings, valves, hydrants, hose stations, standpipes, and aboveground and underground piping and components that are tested in accordance with applicable National Fire Protection Association (NFPA) codes and standards. Such testing assures functionality of systems. Also, many of these systems are normally maintained at required operating pressure and monitored such that leakage resulting in loss of system pressure is immediately detected and corrective actions initiated.

In addition, a sample of sprinkler heads will be inspected using the guidance of NFPA 25 (2002 Edition) Section 5.3.1.1.1. NFPA 25 states that, “where sprinklers have been in place for 50 years, they shall be replaced or representative samples from one or more sample areas shall be submitted to a recognized testing laboratory for field service testing.” NFPA 25 also contains guidance to perform this sampling every 10 years after initial field service testing.

NUREG-1801 Consistency

The Fire Water System Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M27, Fire Water System, with an exception and enhancements.

Exceptions to NUREG-1801

The Fire Water System Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M27, Fire Water System, with the following exception.

Attributes Affected	Exception
4. Detection of Aging Effects	NUREG-1801 specifies annual fire hydrant hose hydrostatic tests. Under the VYNPS program, hydrostatic test of outside hoses occurs once per 24 months; and hydrostatic test of inside hoses occurs once per 3 years. NUREG-1801 specifies annual gasket inspections. Under the VYNPS program, visual inspection, re-racking and replacement of gaskets in couplings occurs at least once per 18 months. NUREG-1801 specifies annual fire hydrant flow tests. Under the VYNPS program, verification of operability and no flow blockage occurs at least once every 3 years. NUREG-1801 specifies sprinkler systems inspections once every refueling outage. Under the VYNPS program, visual inspection of deluge and pre-action system piping to verify their integrity occurs at least once per 24 months.[1]

Exception Note

1. Since aging effects are typically manifested over several years, differences in inspection and testing frequencies are insignificant.

Enhancements

The following enhancements will be initiated prior to the period of extended operation.

Attributes Affected	Enhancements
4. Detection of Aging Effects	A sample of sprinkler heads will be inspected using guidance of NFPA 25 (2002 Edition) Section 5.3.1.1.1. NFPA 25 also contains guidance to repeat this sampling every 10 years after initial field service testing.
4. Detection of Aging Effects	Wall thickness evaluations of fire protection piping will be performed on system components using non-intrusive techniques (e.g., volumetric testing) to identify evidence of loss of material due to corrosion. These inspections will be performed before the end of the current operating term and at intervals thereafter during the period of extended operation. Results of the initial evaluations will be used to determine the appropriate inspection interval to ensure aging effects are identified prior to loss of intended function.

Operating Experience

In 2003, open-head deluge nozzles were verified to be free of damage and free of obstructions that could inhibit the spray pattern. Absence of loss of material on the deluge nozzles provides evidence that the program is effective for managing loss of material for water suppression fire protection system components.

QA audits and NRC integrated and triennial inspections from 2001 to 2004 revealed no issues or findings that could impact effectiveness of the program.

Conclusion

The Fire Water System Program has been effective at managing aging effects. The Fire Water System Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended function consistent with the current licensing basis for the period of extended operation.

B.1.13 FLOW-ACCELERATED CORROSION

Program Description

The Flow-Accelerated Corrosion (FAC) Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.M17, Flow-Accelerated Corrosion.

This program applies to safety-related and nonsafety-related carbon steel components carrying two-phase or single-phase high-energy fluid ≥ 2% of plant operating time.

The program, based on EPRI Report NSAC-202L-R2 recommendations for an effective flow-accelerated corrosion program, predicts, detects, and monitors FAC in plant piping and other pressure retaining components. This program includes (a) an evaluation to determine critical locations, (b) initial operational inspections to determine the extent of thinning at these locations, and (c) follow-up inspections to confirm predictions, or repair or replace components as necessary.

NUREG-1801 Consistency

The Flow-Accelerated Corrosion Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M17, Flow-Accelerated Corrosion.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

Recent inspection results (RFO 23) revealed that repairs or replacements were not necessary. Turbine cross-around piping inspections found that 1995 repairs mitigated the rate of erosion and that wall thickness is acceptable. Absence of loss of material due to flow-accelerated corrosion provides evidence that the program is effective for managing loss of material for carbon steel lines containing high-energy fluids. Also, past repairs, replacements, and modifications have been effective in mitigating FAC.

QA surveillances and self-assessments from 1999 to 2004 revealed no issues or findings that could impact effectiveness of the program.

Conclusion

The Flow-Accelerated Corrosion Program has been effective at managing aging effects. The program has been improved through implementation of lessons learned from operating experience. The Flow-Accelerated Corrosion Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.14 HEAT EXCHANGER MONITORING

Program Description

There is no corresponding NUREG-1801 program.

The Heat Exchanger Monitoring Program will inspect heat exchangers for degradation. If degradation is found, then an evaluation will be performed to evaluate its effects on the heat exchanger's design functions including its ability to withstand a seismic event.

Representative tubes within the sample population of heat exchangers will be eddy current tested at a frequency determined by internal and external operating experience to ensure that effects of aging are identified prior to loss of intended function. Along with each eddy current test, visual inspections will be performed on accessible heat exchanger heads, covers and tube sheets to monitor surface condition for indications of loss of material. The sample population of heat exchangers includes the HPCI gland seal condenser, HPCI lube oil cooler, RCIC lube oil cooler, CST steam reheat coil, drywell atmospheric cooling units (RRU-1, 2, 3 & 4), reactor recirculation pump seal water coolers, reactor recirculation pump motor upper and lower bearing oil coolers, and reactor recirculation pump motor air coolers.

The program will be initiated prior to the period of extended operation.

Evaluation

1. **Scope of Program**

   The Heat Exchanger Monitoring Program will manage aging effects on selected heat exchangers in various systems as identified in aging management reviews.

2. **Preventive Actions**

   This is an inspection program and no actions are taken as part of this program to prevent degradation.

3. **Parameters Monitored/Inspected**

   Where practical, eddy current inspections of shell-and-tube heat exchanger tubes may be performed to determine tube wall thickness. Visual inspections will be performed on heat exchanger heads, covers and tube sheets where accessible to monitor surface condition for indications of loss of material.

4. **Detection of Aging Effects**

   Loss of material is the aging effect managed by this program. Representative tubes within the sample population of heat exchangers will be eddy current tested at a

frequency determined by internal and external operating experience to ensure that effects of aging are identified prior to loss of intended function. Visual inspections of accessible heat exchangers will be performed on the same frequency as eddy current inspections.

An appropriate sample population of heat exchangers will be determined based on operating experience prior to inspections. Inspection can reveal loss of material that could result in degradation of the heat exchangers. Fouling is not addressed by this program.

5. Monitoring and Trending

Results will be evaluated against established acceptance criteria and an assessment will be made regarding the applicable degradation mechanism, degradation rate and allowable degradation level. This information will be used to develop future inspection scope and to modify inspection frequency, if appropriate. Wall thickness will be trended and projected to the next inspection. Corrective actions will be taken if projections indicate that the acceptance criteria may not be met at the next inspection.

6. Acceptance Criteria

The minimum acceptable tube wall thickness for each heat exchanger to be eddy current inspected will be established based upon a component-specific engineering evaluation. Wall thickness will be acceptable if greater than the minimum wall thickness for the component.

The acceptance criterion for visual inspections of heat exchanger heads, covers and tubesheets will be no evidence of degradation that could lead to loss of function. If degradation that could lead to loss of intended function is detected, a condition report will be written and the issue resolved in accordance with the site corrective action program.

7. Corrective Actions

This program will be administered under the site QA program which meets requirements of 10 CFR Part 50, Appendix B.

8. Confirmation Process

This attribute is discussed in Section B.0.3.

9. Administrative Controls

This attribute is discussed in Section B.0.3.

10. Operating Experience

The Heat Exchanger Monitoring Program at VYNPS is a new program for which there is no operating experience.

Conclusion

The Heat Exchanger Monitoring Program will be effective for managing aging effects since it will incorporate proven monitoring techniques and conservative acceptance criteria. The Heat Exchanger Monitoring Program will provide reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.15 INSERVICE INSPECTION

Regulation 10 CFR 50.55a, imposes inservice inspection (ISI) requirements of ASME Code, Section XI, for Class 1, 2, and 3 pressure-retaining components and their integral attachments in light-water cooled power plants. Inspection, repair, and replacement of these components are covered in Subsections IWB, IWC, and IWD, respectively. The program includes periodic visual, surface, and volumetric examination and leakage tests of Class 1, 2, and 3 pressure-retaining components and their integral attachments.

Inservice inspection of supports for ASME piping and components is addressed in Section XI, Subsection IWF. ASME Code Section XI, Subsection IWF constitutes an existing mandated program applicable to managing aging of ASME Class 1, 2, 3, and MC supports for license renewal.

Additionally, 10 CFR 50.55a imposes inservice inspection requirements of ASME Code Section XI for class MC and class CC containment structures. Subsection IWE contains inspection requirements for class MC metal containments and class CC concrete containments. The scope of IWE includes steel liners for concrete containment and their integral attachments; containment hatches and airlocks; moisture barriers; and pressure-retaining bolting.

The program uses nondestructive examination (NDE) techniques to detect and characterize flaws. Three different types of examinations are volumetric, surface, and visual. Volumetric examinations are the most extensive, using methods such as radiographic, ultrasonic or eddy current examinations to locate surface and subsurface flaws. Surface examinations, such as magnetic particle or dye penetrant testing, are used to locate surface flaws.

Three levels of visual examinations are specified. VT-1 visual examination is conducted to assess condition of the surface of the part being examined, looking for cracks and symptoms of wear, corrosion, erosion or physical damage. It can be done with either direct visual observation or with remote examination using various optical/video devices. The VT-2 examination is conducted specifically to locate evidence of leakage from pressure retaining components (period pressure tests). While the system is under pressure for a leakage test, visual examinations are conducted to detect direct or indirect indication of leakage. The VT-3 examination is conducted to determine the general mechanical and structural condition of components and supports and to detect discontinuities and imperfections. For containment inservice inspection, general visual and detailed visual examinations are used in addition to VT examinations as allowed by 10 CFR 50.55a to include applicable relief requests.

The inservice inspection programs are discussed in more detail in the following subsections

Containment Inservice Inspection (CII)

Inservice Inspection (ISI)

B.1.15.1 Containment Inservice Inspection

Program Description

The VYNPS Containment Inservice Inspection (CII) Program is a plant-specific program encompassing the requirements for the inspection of Class MC pressure-retaining components (Primary Containment) and their integral attachments in accordance with the requirements of 10CFR50.55a(b)(2) and the 1998 Edition of ASME Section XI with 2000 Addenda, Inspection Program B.

Evaluation

1. **Scope of Program**

   The CII Program, under ASME Section XI Subsection IWE, manages loss of material and cracking for the primary containment and its integral attachments. The primary containment is a General Electric Mark I pressure suppression containment system. The system consists of a drywell (housing the reactor vessel and reactor coolant recirculation loops), a pressure suppression chamber (housing a water pool), and the connecting vent system between the drywell and the water pool, isolation valves, and containment cooling systems. The code of construction for the containment structure is the ASME Section III, 1965 with winter addenda.

2. **Preventive Actions**

   The CII Program is a monitoring program that does not include preventive actions.

3. **Parameters Monitored/Inspected**

   The primary containment and its attachments are inspected for evidence of cracks, wear, and corrosion.

4. **Detection of Aging Effects**

   The CII Program manages loss of material for the primary containment and its integral attachments.

   The primary inspection method for the primary containment and its integral attachments is visual examination. Visual examinations are performed either directly or remotely with sufficient illumination and resolution suitable for the local environment to assess general conditions that may affect either the containment structural integrity or leak tightness of the pressure retaining component. The program includes augmented ultrasonic exams to measure wall thickness of the containment structure.

5. Monitoring and Trending

Results are compared, as appropriate, to baseline data and other previous test results. If indications are accepted for continued use by analytical evaluation, the areas containing such flaws are monitored during successive inspection periods.

6. Acceptance Criteria

Results are compared, as appropriate, to baseline data, other previous test results, and acceptance criteria of the ASME Section XI, Subsection IWE for evaluation of any evidence of degradation.

7. Corrective Actions

Subsection IWE states that components whose examination results indicate flaws or areas of degradation that do not meet the acceptance standards are acceptable if an engineering evaluation indicates that the flaw or area of degradation is nonstructural in nature or has no effect on the structural integrity of the containment. Except as permitted by 10 CFR 50.55a(b)(ix)(D), components that do not meet the acceptance standards are subject to additional examination requirements, and the components are repaired or replaced to the extent necessary to meet the acceptance standards.

8. Confirmation Process

This attribute is discussed in Section B.0.3.

9. Administrative Controls

This attribute is discussed in Section B.0.3.

10. Operating Experience

RFO 21 inspections found only two areas of potential age-related degradation; the drywell floor to metal containment moisture barrier had missing paint, cracked paint, and areas of corrosion on the base metal in the seal area; and corrosion was found in the area of the X-5G penetration. Engineering evaluation was performed and no significant wall loss was identified. Base metal was prepared, primed and painted to protect it from further corrosion, and the moisture barrier was replaced. RFO 22 inspections found two more areas of potential age-related degradation; surface pitting of primary containment vent headers and vent pipe bowls; and corrosion on torus penetrations X-207A-H. Evaluation determined that the components have significant margin to code minimum wall thickness and that the rate of corrosion is low due to the inerted containment environment during operation. Augmented inspections were not necessary since none of the identified corrosion was significant. RFO 24 inspections revealed flaking coating and rust staining on the bay 3 inner torus wall. Subsequent

ultrasonic examination revealed no material loss. Also, visual inspection of drywell head exterior surface revealed areas of localized missing coating and primer with light corrosion, but no material loss. Resolution of these issues prior to loss of component intended function provides evidence that the program is effective at managing aging effects for primary containment and its integral attachments.

RFO 24 visual inspections of drywell interior surfaces, stabilizer assembly interior surfaces, torus penetrations, and drywell penetrations revealed areas of localized missing coating where the primer is intact, but no corrosion or material loss. Visual inspection of new drywell moisture barrier resulted in no recordable indications. Absence of aging effects on these components provides evidence that the program is effective at managing aging effects for primary containment and its integral attachments.

QA surveillance during RFO 24 revealed a problem with program administrative controls. The issue was addressed and closed. The program was revised to require that engineering evaluations of indications that do not meet acceptance criteria be completed before the containment is declared operable. QA surveillance revealed an issue that could impact effectiveness of the program. Resolution of this issue provides evidence that the program remains effective at managing aging effects for primary containment and its integral attachments.

A recent engineering system health report revealed no issues or findings that could impact effectiveness of the program.

Conclusion

The CII Program has been effective at managing aging effects. The CII Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.15.2 Inservice Inspection

Program Description

The VYNPS Inservice Inspection (ISI) Program is a plant-specific program encompassing ASME Section XI Subsection IWA, IWB, IWC, IWD and IWF requirements.

The VYNPS ISI Program is based on ASME Inspection Program B (IWA-2432), which has 10-year inspection intervals. Every 10 years the program is updated to the latest ASME Section XI code edition and addendum approved by the Nuclear Regulatory Commission in 10CFR50.55a. On September 1, 2003 VYNPS entered the fourth ISI interval. The Code Edition and Addenda used for the fourth interval is the 1998 Edition with 2000 addenda. The current program ensures

that the structural integrity of Class 1, 2, and 3 systems and associated supports is maintained at the level required by the Code of Federal Regulations, 10CFR50.55a.

Evaluation

1. **Scope of Program**

   The Inservice Inspection Program manages cracking, loss of material, and reduction of fracture toughness of reactor coolant system piping, components, and supports. The program implements applicable requirements of ASME Section XI, Subsections IWA, IWB, IWC, IWD and IWF, and other requirements specified in 10CFR50.55a with approved NRC alternatives and relief requests. Every 10 years the Inservice Inspection Program is updated to the latest ASME Section XI code edition and addendum approved by the Nuclear Regulatory Commission in 10CFR50.55a.

   ASME Section XI inspection requirements for Reactor Vessel Internals, (Subsection IWB, Categories B-N-1 and B-N-2) are not in the ISI Program, but are included in the BWR Vessel Internals Program. For more information on the BWR Vessel Internals Program, see Section B.1.7 of this report.

2. **Preventive Actions**

   The Inservice Inspection Program is a condition monitoring program that does not include preventive actions.

3. **Parameters Monitored/Inspected**

   The program uses nondestructive examination (NDE) techniques to detect and characterize flaws. Volumetric examinations such as radiographic, ultrasonic or eddy current examinations are used to locate surface and subsurface flaws. Surface examinations, such as magnetic particle or dye penetrant testing, are used to locate surface flaws.

   Three levels of visual examinations are specified. VT-1 visual examination is conducted to assess the condition of the surface of the part being examined, looking for cracks and symptoms of wear, corrosion, erosion or physical damage. It can be done with either direct visual observation or with remote examination using various optical and video devices. VT-2 visual examination is conducted specifically to locate evidence of leakage from pressure retaining components (period pressure tests). While the system is under pressure for a leakage test, visual examinations are conducted to detect direct or indirect indication of leakage. VT-3 visual examination is conducted to determine general mechanical and structural condition of components and supports and to detect discontinuities and imperfections.

4. Detection of Aging Effects

The Inservice Inspection Program manages cracking and loss of material, as applicable, for carbon steel, low alloy steel and stainless steel/nickel based alloy subcomponents of the reactor pressure vessel using NDE techniques specified in ASME Section XI, Subsection IWB examination categories.

The Inservice Inspection Program manages cracking, loss of preload, loss of material, and reduction of fracture toughness, as applicable, of reactor coolant system components using NDE techniques specified in ASME Section XI, Subsections IWB, IWC and IWD examination categories.

No aging effects requiring management are identified for lubrite sliding supports. However, the ISI Program will confirm the absence of aging effects for the period of extended operation.

The Inservice Inspection Program manages loss of material for ASME Class 1, 2, and 3 steel piping supports and steel component supports within containment, using NDE techniques specified in ASME Section XI, Subsection IWF examination categories.

5. Monitoring and Trending

Results are compared, as appropriate, to baseline data and, other previous test results. If indications are accepted for continued use by analytical evaluation, the areas containing such flaws are monitored during successive inspection periods.

ISI results are recorded every operating cycle and provided to the NRC after each refueling outage via Owner's Activity Reports prepared by the ISI Program Coordinator. These detailed reports include scope of inspection and significant inspection results.

6. Acceptance Criteria

A preservice, or baseline, inspection of program components was performed prior to startup to assure freedom from defects greater than code-allowable. This baseline data also provides a basis for evaluating subsequent inspection results. Since plant startup, additional inspection criteria for Class 2 and 3 components have been imposed by the Code of Federal Regulations, 10CFR50.55a for which baseline data has also been obtained. Results are compared, as appropriate, to baseline data, other previous test results, and acceptance criteria of the ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition, 2000 Addenda, for evaluation of any evidence of degradation.

7. Corrective Actions

If a flaw is discovered during an ISI examination, an evaluation is conducted in accordance with articles IWA-3000, IWB-3000, IWC-3000, IWD-3000 or IWF-3000. If flaws exceed acceptance standards, such flaws are removed, repaired or the component is replaced prior to its return to service. For Class 1, 2, and 3, respectively, repair and replacement is in conformance with IWA-4000. Acceptance of flaws which exceed acceptance criteria may be accomplished through analytical evaluation without repair, removal or replacement of the flawed component if the evaluation meets the criteria specified in the applicable article of the code.

8. Confirmation Process

This attribute is discussed in Section B.0.3.

9. Administrative Controls

This attribute is discussed in Section B.0.3.

10. Operating Experience

Pressure boundary components, including bolting, are evaluated using non-destructive examinations and visual inspections. Deviations from acceptance criteria are properly resolved. Inspections since 2001 revealed erosion of valve body internals, weld indications, recirculation pump bolting corrosion and RHR valve bolting corrosion. The scope of welding inspections was expanded when rejectable indications were identified. Condition reports were used to document indications and ensured resolution of those conditions. Corrective actions included repair and replacement of components. These actions provide evidence that the program is effective at managing aging effects for applicable components.

QA audits, QA surveillances, engineering system health reports, and NRC inspections from 2001 to 2004 revealed no issues or findings that could impact effectiveness of the program.

Conclusion

The ISI Program has been effective at managing aging effects. The ISI Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.16 INSTRUMENT AIR QUALITY

Program Description

The Instrument Air Quality Program is a plant-specific program which ensures that instrument air supplied to components is maintained free of water and significant contaminants, thereby preserving an environment that is not conducive to loss of material. Dewpoint, particulate contamination, and hydrocarbon concentration are periodically checked to verify the instrument air quality is maintained.

Evaluation

1. Scope of Program

This program applies to components within the scope of license renewal and subject to aging management review that are supplied with instrument air, for which pressure boundary integrity is required for the component to perform its intended function.

2. Preventive Actions

System air quality is monitored and maintained within specified limits to ensure that instrument air supplied to components is maintained free of water and significant contaminants, thereby preventing loss of material.

3. Parameters Monitored/Inspected

Dewpoint, particulate contamination and hydrocarbon concentration are periodically checked to verify instrument air quality is maintained.

4. Detection of Aging Effects

Dewpoint, particulate contamination and hydrocarbon concentration are periodically checked to verify instrument air quality is maintained, thereby preventing loss of material. At least once per 18 months, dew point, particulate contamination and hydrocarbon concentration are monitored at several locations in the instrument air system.

5. Monitoring and Trending

Results of sample analyses are maintained in the chemistry log. A condition report is issued if data indicates deteriorating instrument air quality.

6. Acceptance Criteria

- dew point $\leq$ 40°C

- maximum particle size is 3 micrometers
- hydrocarbon content $\leq$ 1ppm

7. Corrective Actions

Corrective actions are carried out in accordance with the VYNPS 10 CFR Part 50, Appendix B, Corrective Action Program.

8. Confirmation Process

This attribute is discussed in Section B.0.3.

9. Administrative Controls

This attribute is discussed in Section B.0.3.

10. Operating Experience

Recent analyses revealed all parameters are maintained within acceptance criteria. Absence of degradation of instrument air quality provides evidence that the program is effective at ensuring that instrument air supplied to components is maintained free of water and significant contaminants, thereby preventing loss of material.

Conclusion

The Instrument Air Quality Program has been effective at managing aging effects. The Instrument Air Quality Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended function consistent with the current licensing basis for the period of extended operation.

B.1.17 NON-EQ INACCESSIBLE MEDIUM-VOLTAGE CABLE

Program Description

The Non-EQ Inaccessible Medium-Voltage Cable Program at VYNPS will be comparable to the program described in NUREG-1801, Section XI.E3, Inaccessible Medium-voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements.

In this program, periodic actions will be taken to prevent cables from being exposed to significant moisture, such as inspecting for water collection in cable manholes and conduit, and draining water, as needed. In scope medium-voltage cables exposed to significant moisture and voltage will be tested to provide an indication of the condition of the conductor insulation. The specific type of test performed will be determined prior to the initial test.

The program will be initiated prior to the period of extended operation.

NUREG-1801 Consistency

The program attributes of the Non-EQ Inaccessible Medium-Voltage Cable Program at VYNPS will be consistent with the program attributes described in NUREG-1801, Section XI.E3, Inaccessible Medium-Voltage Cables Not Subject To 10 CFR 50.49 Environmental Qualification Requirements.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Non-EQ Inaccessible Medium-Voltage Cable Program at VYNPS is a new program for which there is no operating experience

Conclusion

The Non-EQ Inaccessible Medium-Voltage Cable Program will be effective for managing aging effects since it will incorporate appropriate monitoring techniques. The Non-EQ Inaccessible Medium-Voltage Cable Program will provide reasonable assurance that the effects of aging will be managed such that the applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.18 NON-EQ INSTRUMENTATION CIRCUITS TEST REVIEW

Program Description

The Non-EQ Instrumentation Circuits Test Review Program at VYNPS will be comparable to the program described in NUREG-1801, Section XI.E2, Electrical Cables and Connections Not Subject to 10CFR50.49 Environmental Qualification Requirements Used in Instrumentation Circuits.

The Non-EQ Instrumentation Circuits Test Review Program will provide reasonable assurance that the intended functions of instrument cables exposed to adverse localized equipment environments caused by heat, radiation and moisture can be maintained consistent with the current licensing basis through the period of extended operation. An adverse localized environment is significantly more severe than the specified service environment for the cable. This program will consider the technical information and guidance provided in NUREG/CR-5643, IEEE Std. P1205, SAND96-0344, and EPRI TR-109619.

The program will be initiated prior to the period of extended operation.

NUREG-1801 Consistency

The program will be consistent with NUREG-1801, Section XI.E2, Electrical Cables Not Subject to 10CFR50.49 Environmental Qualification Requirements Used in Instrumentation Circuits.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Non-EQ Instrumentation Circuits Tests Review Program at VYNPS is a new program for which there is no operating experience. Industry and plant-specific operating experience will be considered in the development of this program, and future operating experience will be appropriately incorporated into the program.

Conclusion

The Non-EQ Instrumentation Circuits Tests Review Program will incorporate proven monitoring techniques, acceptance criteria, corrective actions, and administrative controls. Implementation of the Non-EQ Instrumentation Circuits Tests Review Program will provide reasonable assurance

that the effects of aging will be managed so that the components within the scope of this program will perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.19 NON-EQ INSULATED CABLES AND CONNECTIONS

Program Description

The Non-EQ Insulated Cables and Connections Program at VYNPS will be comparable to the program described in NUREG-1801, Section XI.E1, Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements.

The Non-EQ Insulated Cables and Connections Program will provide reasonable assurance that intended functions of insulated cables and connections exposed to adverse localized environments caused by heat, radiation and moisture can be maintained consistent with the current licensing basis through the period of extended operation. An adverse localized environment is significantly more severe than the specified service condition for the insulated cable or connection.

A representative sample of accessible insulated cables and connections within the scope of license renewal will be visually inspected for cable and connection jacket surface anomalies such as embrittlement, discoloration, cracking or surface contamination. The technical basis for sampling will be determined using EPRI document TR-109619, Guideline for the Management of Adverse Localized Equipment Environments.

The program will be initiated prior to the period of extended operation.

NUREG-1801 Consistency

The Non-EQ Insulated Cables and Connections Program at VYNPS will be consistent with the program described in NUREG-1801, Section XI.E1, Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Non-EQ Insulated Cables and Connections Program at VYNPS is a new program for which there is no operating experience.

Conclusion

The Non-EQ Insulated Cables and Connections Program will be effective for managing aging effects since it will incorporate proven monitoring techniques, acceptance criteria, corrective actions, and administrative controls. The Non-EQ Insulated Cables and Connections Program will provide reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.20 OIL ANALYSIS

Program Description

The Oil Analysis Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.M39, Lubricating Oil Analysis.

The Oil Analysis Program maintains oil systems free of contaminants (primarily water and particulates) thereby preserving an environment that is not conducive to loss of material, cracking, or fouling.

Sampling frequencies are based on vendor recommendations, accessibility during plant operation, equipment importance to plant operation, and previous test results.

NUREG-1801 Consistency

The Oil Analysis Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M39, Lubricating Oil Analysis, with one exception.

Exceptions to NUREG-1801

The Oil Analysis Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M39, Lubricating Oil Analysis, with the following exception.

Attributes Affected	Exception
3. Parameters Monitored/Inspected	Flash point is not determined for sampled oil.[1]

Exception Note

1. Analyses of filter residue or particle count, viscosity, total acid/base (neutralization number), water content, and metals content provide sufficient information to verify the oil is suitable for continued use.

Enhancements

None

Operating Experience

A negative trend was noted in the lube oil analysis report for the P-40-1A diesel fire pump. Oil was drained, flushed, and refilled. A lube oil sample taken on the B emergency diesel generator

indicated an abnormally high silicon level. Cause was determined to be gasket sealant materials used during the last EDG overhaul causing a temporarily high non-abrasive silicon level in the oil. Although acceptance criteria do not include an upper threshold for silicon, re-sampling confirmed that the silicon level went down. Corrective action following negative trends and abnormal samples provides evidence that the program is effective at preserving an environment that is not conducive to loss of material, cracking or fouling.

Recent QA surveillance and self-assessment revealed no issues or findings that could impact effectiveness of the program.

Conclusion

The Oil Analysis Program has been effective at managing aging effects. The Oil Analysis Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended function consistent with the current licensing basis for the period of extended operation.

B.1.21 ONE-TIME INSPECTION

Program Description

The One-Time Inspection Program at VYNPS is a new program that will be implemented prior to the period of extended operation. The program will be comparable to the program described in NUREG-1801, Section XI.M32, One-Time Inspection. The one-time inspection activity for small bore piping in the reactor coolant system and associated systems that form the reactor coolant pressure boundary, will also be comparable to the program described in NUREG-1801, Section XI.M35, One-Time Inspection of ASME Code Class I Small-Bore Piping. The VYNPS program will be consistent with the program elements described in NUREG-1801.

The program will include one activity to verify effectiveness of an aging management program and activities to confirm the absence of aging effects as described below.

Water chemistry control programs	One-time inspection activity will verify the effectiveness of the water chemistry control aging management programs by confirming that unacceptable cracking, loss of material, and fouling is not occurring.
Internal carbon steel surfaces exposed to indoor air in the standby gas treatment system	One-time inspection activity will confirm that loss of material is not occurring or is so insignificant that an aging management program is not warranted.
Internal surfaces of carbon steel and copper alloy components in the potable water and radwaste systems containing untreated water	One-time inspection activity will confirm that loss of material is not occurring or is so insignificant that an aging management program is not warranted.
Carbon steel retired in place (RIP) system components in the area around containment penetration X-21	One-time inspection activity will confirm that loss of material is not occurring or is so insignificant that an aging management program is not warranted.
Small bore piping in the reactor coolant system and associated systems that form the reactor coolant pressure boundary	One-time inspection activity will confirm that cracking, loss of material, and reduction of fracture toughness are not occurring or are so insignificant that an aging management program is not warranted.
RV flange leakoff line	One-time inspection activity will confirm that cracking is not occurring or is so insignificant that an aging management program is not warranted.

Main steam flow restrictors (CASS)	One-time inspection activity will confirm that loss of material, cracking, and reduction of fracture toughness are not occurring or are so insignificant that an aging management program is not warranted.

The elements of the program include (a) determination of the sample size based on an assessment of materials of fabrication, environment, plausible aging effects, and operating experience; (b) identification of the inspection locations in the system or component based on the aging effect; (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect for which the component is examined; and (d) evaluation of the need for follow-up examinations to monitor the progression of any aging degradation.

When evidence of an aging effect is revealed by a one-time inspection, routine evaluation of the inspection results will identify appropriate corrective actions.

The inspection will be performed within the 10 years prior to the period of extended operation.

NUREG-1801 Consistency

The One-Time Inspection Program will be consistent with the program described in NUREG-1801, Section XI.M32, One-Time Inspection. The one-time inspection activity for small bore piping in the reactor coolant system and associated systems that form the reactor coolant pressure boundary, will also be comparable to the program described in NUREG-1801, Section XI.M35, One-Time Inspection of ASME Code Class I Small-Bore Piping.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The One-Time Inspection Program is a new program for which there is no operating experience. Industry and plant-specific operating experience will be considered in development of this program, as appropriate.

Conclusion

Verification of the effectiveness of the Water Chemistry Control programs and confirmation of the absence of aging effects on specific standby gas treatment, potable water, instrument air, radwaste, retired in place, and reactor coolant system components will be undertaken in the One-Time Inspection Program to ensure component intended functions can be maintained in accordance with the current licensing basis (CLB) during the period of extended operation.

B.1.22 PERIODIC SURVEILLANCE AND PREVENTIVE MAINTENANCE

Program Description

There is no corresponding NUREG-1801 program.

The Periodic Surveillance and Preventive Maintenance Program includes periodic inspections and tests that manage aging effects not managed by other aging management programs. The preventive maintenance and surveillance testing activities are generally implemented through repetitive tasks or routine monitoring of plant operations. Credit for program activities has been taken in the aging management review of the following systems and structures.

reactor building	Perform visual or other non-destructive examination to manage loss of material for the reactor building crane, rails, and girders, refueling platform carbon steel components, and equipment lock sliding doors.
	Perform the secondary containment capability check to confirm the absence of aging effects for reactor building exterior concrete walls.
	Perform leakage test on the reactor building railroad inner and outer doors to verify the absence of significant cracking and change in material properties for the rubber seals.
yard structures	Perform visual inspection to confirm the absence of aging effects for yard concrete handholes and manholes.
high pressure coolant injection system	Use visual or other NDE techniques to inspect a representative sample of the internals of the gland seal exhauster (FN-2-1A) fan housing and piping to manage loss of material.
standby gas treatment system	Use visual or other NDE techniques to inspect internal and external surfaces of the demisters and a representative sample of the demister loop seal components to manage loss of material.
primary containment atmosphere control system	Visually inspect external surfaces of the hydrogen analyzer pre-cooler (heat exchangers) to manage fouling.
service water systems	Visually inspect the housings of the RHR corner room heat exchangers, RRU-5 and RRU-6, to manage loss of material.
emergency diesel generator system	Perform EDG operability testing to manage fouling for copper alloy intake air cooler tubes.

	Use visual or other NDE techniques to inspect the intake air cooler tubes and fins to manage fouling and loss of material due to wear. Use visual or other NDE techniques to inspect a representative sample of EDG intake air, air start, and exhaust components to manage loss of material and cracking.
heating, ventilation and air conditioning system	Visually inspect the housings of the ECCS corner room recirculation units (RRU-7 and RRU-8), control room HVAC package heating and cooling coils (SAC-1), control room chiller (SCH-1), and control room chilled water condensers (SACC-1A and SACC-1B) to manage loss of material. Visually inspect and manually flex the flexible connection between SAC-1A and DUCT-TB-3, flexible connections between SAC-1A/1B and DUCT-TB-1, and flexible connections between SAC-1A/1B and DUCT-TB-2, to verify the absence of cracks and significant change in material properties. Perform testing of the control room chilled water condensers (SACC-1A and SACC-1B) to verify they are capable of removing the required amount of heat. This testing will manage fouling for these copper alloy heat exchangers.
John Deere diesel	Use visual or other NDE techniques to inspect a representative sample of John Deere diesel intake air and exhaust gas components to manage loss of material and cracking. Perform John Deere operability testing to manage fouling for the lube oil cooler and radiator. Use visual or other NDE techniques to inspect John Deere diesel lube oil cooler and radiator to manage loss of material and fouling.
nonsafety-related systems and components affecting safety-related systems	Use visual or other NDE techniques to inspect a representative sample of nonsafety-related components of the circulating water system, diesel generator air start subsystem, and instrument air supply system to manage loss of material.

Evaluation

1. Scope of Program

The VYNPS Periodic Surveillance and Preventive Maintenance Program, with regard to license renewal, includes those tasks credited with managing aging effects identified in aging management reviews.

2. Preventive Actions

Inspection and testing activities used to identify component aging effects do not prevent aging effects. However, activities are intended to prevent failures of components that might be caused by aging effects.

3. Parameters Monitored/Inspected

This program provides instructions for monitoring structures, systems, and components to detect degradation. Inspection and testing activities monitor various parameters including system flow, system pressure, surface condition, loss of material, presence of corrosion products, and signs of cracking.

4. Detection of Aging Effects

Preventive maintenance activities and periodic surveillances provide for periodic component inspections and testing to detect aging effects. Inspection intervals are established such that they provide timely detection of degradation. Inspection intervals are dependent on component material and environment and take into consideration industry and plant-specific operating experience and manufacturers' recommendations. Each inspection or test occurs at least once every ten years

The extent and schedule of inspections and testing assure detection of component degradation prior to loss of intended functions. Established techniques such as visual inspections are used.

5. Monitoring and Trending

Preventive maintenance and surveillance testing activities provide for monitoring and trending of aging degradation. Inspection and testing intervals are established such that they provide for timely detection of component degradation. Inspection and testing intervals are dependent on component material and environment and take into consideration industry and plant-specific operating experience and manufacturers' recommendations.

6. Acceptance Criteria

Periodic Surveillance and Preventive Maintenance Program acceptance criteria are defined in specific inspection and testing procedures. The procedures confirm component integrity by verifying the absence of aging effects or by comparing applicable parameters to limits based on applicable intended functions established by plant design basis.

7. Corrective Actions

The site Corrective Action Program, quality assurance procedures, site review and approval process, and administrative controls are implemented in accordance with requirements of 10 CFR Part 50, Appendix B.

8. Confirmation Process

This attribute is discussed in Section B.0.3.

9. Administrative Controls

This attribute is discussed in Section B.0.3.

10. Operating Experience

Recent inspection results (2001-2004) provide evidence that the program is effective for managing aging effects for applicable components. For example, material condition of cranes was consistent with inspection acceptance criteria referenced in the program documents, i.e. no significant corrosion or wear; equipment lock sliding doors had no significant wear or corrosion; HPCI turbine gland seal condenser tubes were not fouled; HPCI turbine casing had no significant corrosion or erosion; standby gas treatment demister and loop seal components had no significant corrosion; John Deere diesel exhaust gas components had no significant corrosion or cracking; and ECCS corner room recirculation units had no significant corrosion.

QA audits and surveillances, self-assessments, engineering system health reports, and NRC inspections from 2001 to 2004 concluded that actions to preclude recurrence of a previous adverse trend were effective and revealed no issues or findings that could impact effectiveness of the program.

Enhancements

Prior to the period of extended operation, program activity implementing documents will be enhanced as necessary to assure that the effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

Conclusion

The Periodic Surveillance and Preventive Maintenance Program has been effective at managing aging effects. The Periodic Surveillance and Preventive Maintenance Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.23 REACTOR HEAD CLOSURE STUDS

Program Description

The Reactor Head Closure Studs Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.M3, Reactor Head Closure Studs.

This VYNPS program includes inservice inspection (ISI) in conformance with the requirements of ASME Section XI, Subsection IWB, and preventive measures (e.g. rust inhibitors, stable lubricants, appropriate materials) to mitigate cracking and loss of material of reactor head closure studs, nuts, washers, and bushings.

NUREG-1801 Consistency

The Reactor Head Closure Studs Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M3, Reactor Head Closure Studs, with one exception.

Exceptions to NUREG-1801

The Reactor Head Closure Studs Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M3, Reactor Head Closure Studs, with the following exception.

Attributes Affected	Exception
4. Detection of Aging Effects	When reactor head closure studs are removed for examination, either a surface or volumetric examination is allowed.[1]

Exception Note

1. Cracking initiates on the outside surfaces of bolts and studs. Therefore, a qualified surface examination meeting the acceptance standards of IWB-3515 provides at least the sensitivity for flaw detection that an end shot ultrasonic examination provides on bolts or studs. Thus, when reactor head closure studs are removed for examination, either a surface or volumetric examination is allowed.

Enhancements

None

Operating Experience

Recent (2002 and 2004) visual and ultrasonic inspections of reactor vessel studs, nuts, bushings, and washers revealed no recordable indications. Absence of indications provides evidence that the program is effective for managing loss of material and cracking for applicable components.

Conclusion

The Reactor Head Closure Studs Program has been effective at managing aging effects. The Reactor Head Closure Studs Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.24 REACTOR VESSEL SURVEILLANCE

Program Description

The Reactor Vessel Surveillance Program complies with the guidelines for an acceptable Integrated Surveillance Program described in NUREG-1801, Section XI.M31, Reactor Vessel Surveillance. This program manages reduction in fracture toughness of reactor vessel beltline materials to assure that the pressure boundary function of the reactor pressure vessel is maintained for the period of extended operation.

VYNPS is a participant in the Boiling Water Reactor Vessel and Internals Project (BWRVIP) Integrated Surveillance Program (ISP) as approved by License Amendment 218. This program monitors changes in the fracture toughness properties of ferritic materials in the reactor pressure vessel (RPV) beltline region. As BWRVIP-ISP capsule test reports become available for RPV materials representative of VYNPS, the actual shift in the reference temperature for nil-ductility transition of the vessel material may be updated. In accordance with 10CFR50 Appendix H, VYNPS reviews relevant test reports to assure compliance with fracture toughness requirements and P-T limits.

BWRVIP-116, “BWR Vessel and Internals Project Integrated Surveillance Program (ISP) Implementation for License Renewal,” describes the design and implementation of the ISP during the period of extended operation. BWRVIP-116 identifies additional capsules, their withdrawal schedule, and contingencies to ensure that the requirements of 10CFR50 Appendix H are met for the period of extended operation.

NUREG-1801 Consistency

The Reactor Vessel Surveillance Program at VYNPS will be consistent with the program described in NUREG-1801, Section XI.M31, Reactor Vessel Surveillance, with one enhancement.

Exceptions to NUREG-1801

None

Enhancements

The following enhancement will be initiated prior to the period of extended operation.

Attributes Affected	Enhancement
5. Monitoring and Trending Actions 6. Acceptance Criteria 7. Corrective Actions	The Reactor Vessel Surveillance Program will be enhanced to proceduralize the data analysis, acceptance criteria, and corrective actions described in this program description.

Operating Experience

VYNPS is a participant in the Boiling Water Reactor Vessel and Internals Project (BWRVIP) Integrated Surveillance Program (ISP) as incorporated into the plant Technical Specifications by Amendment 218. The fact that VYNPS participates in the BWRVIP ISP ensures that future operating experience from all participating BWRs will be factored into this program.

Conclusion

The Reactor Vessel Surveillance Program ensures that reactor vessel degradation is identified and corrective actions are taken prior to exceeding allowable limits. The Reactor Vessel Surveillance Program provides reasonable assurance that aging effects will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.25 SELECTIVE LEACHING

Program Description

The Selective Leaching Program at VYNPS will be comparable to the program described in NUREG-1801, Section XI.M33 Selective Leaching of Materials.

The Selective Leaching Program will ensure the integrity of components made of cast iron, bronze, brass, and other alloys exposed to raw water, treated water, or groundwater that may lead to selective leaching. The program includes a one-time visual inspection and hardness measurement of selected components that may be susceptible to selective leaching to determine whether loss of material due to selective leaching is occurring, and whether the process will affect the ability of the components to perform their intended function for the period of extended operation.

The program will be initiated prior to the period of extended operation.

NUREG-1801 Consistency

The Selective Leaching Program at VYNPS will be consistent with the program described in NUREG-1801, Section XI.M33 Selective Leaching of Materials.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Selective Leaching Program is a new program for which there is no operating experience.

Conclusion

The Selective Leaching Program will be effective for managing aging effects since it will incorporate proven monitoring techniques, acceptance criteria, corrective actions, and administrative controls. The Selective Leaching Program will provide reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.26 SERVICE WATER INTEGRITY

Program Description

The Service Water Integrity Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.M20, Open-Cycle Cooling Water System.

This program relies on implementation of the recommendations of GL 89-13 to ensure that the effects of aging on the service water systems (SWS) will be managed for the period of extended operation. The SWS include the service water, residual heat removal service water, and alternate cooling systems. The program includes surveillance and control techniques to manage aging effects in the SWS or structures and components serviced by the SWS.

NUREG-1801 Consistency

The Service Water Integrity Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M20, Open-Cycle Cooling Water System with exceptions.

Exceptions to NUREG-1801

The Service Water Integrity Program at VYNPS is consistent with the program described in NUREG-1801, Section XI.M20, Open-Cycle Cooling Water System with the following exceptions.

Attributes Affected	Exceptions
2. Preventive Actions	NUREG-1801 states that system components are lined or coated. Components are lined or coated only where necessary to protect the underlying metal surfaces.[1]
5. Monitoring and Trending	NUREG-1801 states that testing and inspections are performed annually and during refueling outages. The VYNPS program requires tests and inspections each refueling outage.[2]

Exception Notes

1. NUREG-1801 states that system components are constructed of appropriate materials and lined or coated to protect the underlying metal surfaces from being exposed to aggressive cooling water environments. Not all VYNPS system components are lined or coated. Components are lined or coated only where necessary to protect the underlying metal surfaces.

2. NUREG-1801 program entails testing and inspections performed annually and during refueling outages. The VYNPS program requires tests and inspections each refueling outage, but not annually. Since aging effects are typically manifested over several years, the difference in inspection and testing frequency is insignificant.

Enhancements

None

Operating Experience

Recent performance test and inspection results (2004) provide evidence that the program is effective for managing aging effects for applicable components. For example, diesel generator service water cooled heat exchanger performance testing revealed no significant performance degradation, RHR heat exchanger inspection revealed no loss of material, cracking or fouling, a service water check valve internal visual inspection revealed no loss of material, and internal visual inspection of a service water pipe using fiber optics revealed no loss of material.

Ultrasonic wall thickness measurements taken in October 2003 and January 2004 in the vicinity of known wall-thinning in a service water pipe revealed that the pipe wall thickness had not changed and the structural integrity of the piping would be maintained until the section of pipe could be replaced. Section of pipe was replaced in September 2004. Accelerated monitoring in the vicinity of an indication provides assurance that the program is effective for managing loss of material for applicable components.

NRC inspection of the service water system in 2002 determined that mitigation of MIC buildup had not been effective as evidenced by more than 20 service water system leaks. A self-assessment, including independent evaluation by industry experts, was completed on 12/20/2002. Protocols for use of biocides to mitigate MIC were revised and the processes for analysis, trending, and interpretation of results were enhanced. Resolution of this issue assures that the program will manage aging effects for applicable components.

Conclusion

The Service Water Integrity Program has been effective at managing aging effects. The Service Water Integrity Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended function consistent with the current licensing basis for the period of extended operation.

B.1.27 STRUCTURES MONITORING

The Structures Monitoring programs are discussed in more detail in the following subsections

Masonry Wall

Structures Monitoring

Vernon Dam FERC Inspection

B.1.27.1 Masonry Wall

Program Description

The Masonry Wall Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.S5, Masonry Wall Program.

The objective of the Masonry Wall Program is to manage aging effects so that the evaluation basis established for each masonry wall within the scope of license renewal remains valid through the period of extended operation.

The program includes all masonry walls identified as performing intended functions in accordance with 10 CFR 54.4. Included walls are the 10CFR50.48-required walls and masonry walls in the reactor building, intake structure, control room building, and turbine building.

Masonry walls are visually examined at a frequency selected to ensure there is no loss of intended function between inspections.

NUREG-1801 Consistency

The Masonry Wall Program is consistent with the program described in NUREG-1801, Section XI.S5, Masonry Wall Program.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

Recent inspections (2002 and 2004) revealed no cracking of masonry walls within the scope of license renewal that could potentially affect wall qualification, providing evidence that the program is effective for managing cracking for masonry and block walls.

QA surveillance and self-assessment in 2002 and 2004 revealed no issues or findings that could impact effectiveness of the program.

Conclusion

The Masonry Wall Program has been effective at managing aging effects. The Masonry Wall Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.27.2 Structures Monitoring

Program Description

The Structures Monitoring Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.S6, Structures Monitoring Program.

Structures monitoring in accordance with 10 CFR 50.65 (Maintenance Rule) is addressed in Regulatory Guide 1.160 and NUMARC 93-01. These two documents provide guidance for development of licensee-specific programs to monitor the condition of structures and structural components within the scope of the Maintenance Rule, such that there is no loss of structure or structural component intended function.

Since protective coatings are not relied upon to manage the effects of aging for structures included in the Structures Monitoring Program, the program does not address protective coating monitoring and maintenance.

NUREG-1801 Consistency

The Structures Monitoring Program is consistent with the program described in NUREG-1801, Section XI.S6, Structures Monitoring Program.

Exceptions to NUREG-1801

None

Enhancements

The following enhancements will be initiated prior to the period of extended operation.

Attributes Affected	Enhancements
1. Scope of Program	The Structures Monitoring Program will be enhanced to specify that process facility crane rails and girders, CST enclosure, CO_2 tank enclosure, N_2 tank enclosure and restraining wall, CST pipe trench, diesel generator cable trench, fuel oil pump house, service water pipe trench, drywell floor liner seal, manway seals and gaskets, and hatch seals and gaskets are included in the program.
4. Detection of Aging Effects	Guidance for performing structural examinations of wood to identify loss of material, cracking, and change in material properties will be added to the Structures Monitoring Program.
4. Detection of Aging Effects	Guidance for performing structural examinations of elastomers (drywell floor liner, seals, and gaskets) to identify cracking and change in material properties (cracking when manually flexed) will be enhanced in the Structures Monitoring Program procedure.
4. Detection of Aging Effects	Guidance for performing structural examinations of PVC cooling tower fill to identify cracking and change in material properties will be added to the Structures Monitoring Program procedure.

Operating Experience

The concrete pad above John Deere diesel generator day tank was sinking and cracking. The pad was repaired, with steel bollards installed to prevent future sinking and cracking. Cooling tower inspections identified degradation of a structural column; localized cracking of a wooden structural member. The damaged column and associated splice connection were replaced. Resolution of these issues provides evidence that the program is effective for managing cracking of structural components.

Recent performance test and inspection results (2002 and 2003) provide evidence that the program is effective for managing aging effects for applicable components. For example, inspection of the turbine building crane resulted in no findings; inspection of the reactor building overhead crane in 2002 resulted in no findings; and inspection of the reactor building airlock door seal revealed no cracking, dry rot, bulging, or separation of the seal.

The most recent structures monitoring inspection determined the overall condition of structures at VYNPS is very good. Inspections were conducted in 2004 in the reactor building, turbine building, diesel generator rooms, fuel oil day tank room, control building, plant stack, switch yard, discharge structure, intake structure, and John Deere diesel building. Absence of significant findings during these inspections provides evidence that the program is effective for managing loss of material, cracking, and change in material properties for structural components.

Conclusion

The Structures Monitoring Program has been effective for managing aging effects. The Structures Monitoring Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.27.3 Vernon Dam FERC Inspection

Program Description

There is no corresponding NUREG-1801 program.

The Vernon dam is subject to the Federal Energy Regulatory Commission (FERC) 5-year inspection program. This program consists of a visual inspection by a qualified independent consultant approved by FERC, and is in compliance with Title 18 of the Code of Federal Regulations, Conservation of Power and Water Resources, Part 12 (Safety of Water Power Projects and Project Works), Subpart D (Inspection by Independent Consultant). The NRC has found that mandated FERC 5-year inspection programs are acceptable for aging management.

Operating Experience

Recent inspections (1998-2002) of the Vernon Dam found minor concrete erosion on the spillway, a crack on a downstream pier, concrete surface erosion in the stanchion flashboard section, spalling at the base of a trash sluice wall, and a crack in the spillway gallery. None of these conditions are threatening structural support and, therefore, do not require immediate repair. However, the areas of degradation will continue to be monitored. Continued monitoring of minor degradation provides evidence that the program is effective for managing aging effects for the dam.

Recent FERC assessment (2002) of the Vernon Dam structures found that structures and components are maintained in accordance with terms of the license, including daily visual inspections of structural integrity, and periodic underwater inspections on both the upstream and downstream sides of the dam.

Conclusion

The Vernon Dam FERC Inspection (FERC 5-year inspection) has been effective at managing aging effects. The program employs visual inspection techniques that have proven effective at detecting aging effects on hydroelectric dams. The Vernon Dam FERC Inspection provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.28 SYSTEM WALKDOWN

Program Description

The System Walkdown Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.M36, External Surfaces Monitoring.

This program entails inspections of external surfaces of components subject to aging management review. The program is also credited with managing loss of material from internal surfaces, for situations in which internal and external material and environment combinations are the same such that external surface condition is representative of internal surface condition.

NUREG-1801 Consistency

The System Walkdown Program is consistent with the program described in NUREG-1801, Section XI.M36, External Surfaces Monitoring.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

A 1999 self-assessment determined that corrective actions for deficient conditions identified during system walkdowns were effective and received a timely closeout, assuring that the program will manage loss of material for applicable components.

Peer assessment identified that system engineering management was not using sufficient metrics for monitoring core functions of the department. New oversight standards included the expectation for supervisors to perform walkdowns with system engineers to ensure walkdown quality expectations are being satisfied. Program oversight was increased during 2003, providing assurance that the program will manage loss of material for applicable components.

Recent system walkdowns (2003 and 2004) of the circulating water, standby liquid control, and reactor building HVAC systems have identified leakage or degradation prior to loss of intended function, providing evidence that the program is effective for managing loss of material for applicable components.

Conclusion

The System Walkdown Program has been effective at managing aging effects. The System Walkdown Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.29 THERMAL AGING AND NEUTRON IRRADIATION EMBRITTLEMENT OF CAST AUSTENITIC STAINLESS STEEL (CASS)

Program Description

The Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program at VYNPS will be comparable to the program described in NUREG-1801, Section XI.M13, Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS).

The purpose of the Thermal Aging and Neutron Irradiation Embrittlement of CASS Program is to assure that reduction of fracture toughness due to thermal aging and reduction of fracture toughness due to radiation embrittlement will not result in loss of the intended function. This program will evaluate CASS components in the reactor vessel internals and require non-destructive examinations as appropriate.

EPRI, the BWR Owners Group and other industry groups are focused on reactor vessel internals to ensure a better understanding of aging effects. Future Boiling Water Reactor Vessel Internals Project (BWRVIP) reports, EPRI reports, and other industry operating experience will provide additional bases for evaluations and inspections under this program. This program will supplement reactor vessel internals inspections required by the BWR Vessel Internals Program to assure that aging effects do not result in loss of the intended functions of reactor vessel internals during the period of extended operation.

The program will be initiated prior to the period of extended operation.

NUREG-1801 Consistency

The Thermal Aging and Neutron Irradiation Embrittlement of CASS Program will be consistent with the program described in NUREG-1801, Section XI.M13, Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Thermal Aging and Neutron Irradiation Embrittlement of CASS Program is a new program for which there is no operating experience.

Conclusion

The Thermal Aging and Neutron Irradiation Embrittlement of CASS Program will use existing techniques with demonstrated capability and a proven industry record to provide reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.30 WATER CHEMISTRY CONTROL

The VYNPS chemistry program is the personnel, programs, policies and procedures designed to control site water chemistry to maximize plant availability, extend operating lifetime, and minimize radiation levels. Based on applicable EPRI Guidelines, the program controls contaminants at lowest practical levels and provides corrosion protection for major systems and components.

The following subsections address individual VYNPS water chemistry control programs in more detail.

Water Chemistry Control – Auxiliary Systems

Water Chemistry Control – BWR

Water Chemistry Control – Closed Cooling Water

B.1.30.1 Water Chemistry Control – Auxiliary Systems

Program Description

There is no corresponding NUREG-1801 program.

The purpose of the Water Chemistry Control – Auxiliary Systems Program is to manage aging effects for components exposed to treated water.

Program activities include sampling and analysis of stator cooling water and plant heating boiler systems, and flushing of the John Deere Diesel cooling water system.

Evaluation

1. **Scope of Program**

   Program activities include sampling and analysis of stator cooling water and plant heating boiler systems, and flushing of the John Deere Diesel cooling water system.

2. **Preventive Actions**

   The program includes monitoring and control of stator cooling water and plant heating boiler feedwater to minimize exposure to aggressive environments and application of corrosion inhibitors to manage general, crevice, and pitting corrosion.

   John Deere diesel cooling water chemistry is controlled to minimize exposure to aggressive environments by periodic flushing and replacement of the coolant and coolant conditioner.

3. Parameters Monitored/Inspected

In accordance with industry recommendations, stator cooling water and plant heating boiler feedwater parameters monitored include conductivity, corrosion products, and dissolved oxygen.

4. Detection of Aging Effects

The program manages loss of material for stator cooling water, plant heating boiler, and John Deere diesel system components.

The One-Time Inspection Program describes inspections planned to verify the effectiveness of water chemistry control programs to ensure that significant degradation is not occurring and component intended function is maintained during the period of extended operation.

5. Monitoring and Trending

Values from analyses are archived for long-term trending and review.

6. Acceptance Criteria

Acceptance criteria for chemistry parameters are in accordance with specific manufacturer's recommendations and general guidelines provided in EPRI Report 1007820, "Revision 1 to TR-107396, Closed Cooling Water Chemistry Guidelines."

7. Corrective Actions

If acceptance criteria are not met, chemistry parameters are adjusted as appropriate. Additional sampling and verification is performed if necessary. Corrective actions for unacceptable inspection results are identified and implemented in accordance with the Corrective Action Program.

8. Confirmation Process

This attribute is discussed in Section B.0.3.

9. Administrative Controls

This attribute is discussed in Section B.0.3.

10. Operating Experience

Stator cooling water and house heating boiler sample results in 2004 and 2005 show parameters within acceptance criteria, providing evidence that the program is

effective for managing loss of material, cracking, and fouling for applicable components.

A QA audit in 2003 revealed no issues or findings that could impact effectiveness of the program.

Enhancement

The following enhancement will be initiated prior to the period of extended operation.

Attributes Affected	Enhancement
1. Scope of Program	Procedures will be enhanced to flush the John Deere diesel cooling water system and replace the coolant and coolant conditioner every three years.

Conclusion

The Water Chemistry Control – Auxiliary Systems Program has been effective at managing loss of material for components exposed to treated water. The Water Chemistry Control – Auxiliary Systems Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.30.2 Water Chemistry Control – BWR

Program Description

The Water Chemistry Control – BWR Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.M2, Water Chemistry.

The objective of this program is to manage aging effects caused by corrosion and cracking mechanisms. The program relies on monitoring and control of water chemistry based on EPRI Report 1008192 (BWRVIP-130). BWRVIP-130 has three sets of guidelines: one for primary water, one for condensate and feedwater, and one for control rod drive (CRD) mechanism cooling water. EPRI guidelines in BWRVIP-130 also include recommendations for controlling water chemistry in the torus, condensate storage tank, demineralized water storage tanks, and spent fuel pool.

The VYNPS Water Chemistry Control – BWR Program optimizes the primary water chemistry to minimize the potential for loss of material and cracking. This is accomplished by limiting the

levels of contaminants in the RCS that could cause loss of material and cracking. Additionally, VYNPS has instituted hydrogen water chemistry (HWC) with noble metals to limit the potential for intergranular SCC (IGSCC) through the reduction of dissolved oxygen in the treated water.

NUREG-1801 Consistency

The Water Chemistry Control – BWR Program is consistent with the program described in NUREG-1801, Section XI.M2, Water Chemistry.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

For the first 158 operating days of Cycle 24 (May – November 2004), sulfate and chloride levels in the reactor water, while within EPRI guideline acceptance criteria, were significantly higher than during Cycle 23. An engineering and chemistry evaluation determined the most probable sources of chloride and sulfate ingress and identified contributing causes of the extended time required to reduce reactor water chemistry to normal low levels. Corrective actions included enhanced control of chemical ingress, increased condensate and feedwater cleaning, and enhanced demineralizer filter replacement procedures. Resolution of higher than normal reactor water sulfate and chloride levels, prior to exceeding EPRI guideline acceptance criteria, provides assurance that the program will ensure adequate water quality to preclude loss of material, cracking, and fouling of applicable components.

A QA audit in 2003 revealed no issues or findings that could impact effectiveness of the program.

Conclusion

The Water Chemistry Control – BWR Program has been effective at managing aging effects. The Water Chemistry Control – BWR Program at VYNPS provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.1.30.3 Water Chemistry Control – Closed Cooling Water

Program Description

The Water Chemistry Control – Closed Cooling Water Program at VYNPS is comparable to the program described in NUREG-1801, Section XI.M21, Closed-Cycle Cooling Water System.

This VYNPS program includes preventive measures that manage loss of material, cracking, and fouling for closed cooling water system systems (reactor building closed cooling water, turbine building closed cooling water, AOG closed cooling water, emergency diesel generator closed cooling water, AOG refrigerant skid water, and chilled water). These chemistry activities provide for monitoring and controlling closed cooling water chemistry using VYNPS procedures and processes based on EPRI guidance for closed cooling water chemistry.

NUREG-1801 Consistency

The Water Chemistry Control – Closed Cooling Water Program is consistent with the program described in NUREG-1801, Section XI.M21, Closed-Cycle Cooling Water System, with one exception.

Exceptions to NUREG-1801

The Water Chemistry Control – Closed Cooling Water Program is consistent with the program described in NUREG-1801, Section XI.M21, Closed-Cycle Cooling Water System, with the following exception.

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Attributes Affected	Exception
4. Detection of Aging Effects	The VYNPS Water Chemistry Control – Closed Cooling Water Program does not include performance and functional testing.[1]

Exception Note

1. While NUREG-1801, Section XI.M21, Closed-Cycle Cooling Water System endorses EPRI report TR-107396 for performance and functional testing guidance, EPRI report TR-107396 does not recommend that equipment performance and functional testing be part of a water chemistry control program. This appears appropriate since monitoring pump performance parameters is of little value in managing effects of aging on long-lived, passive CCW system components. Rather, EPRI report TR-107396 states in section 5.7 (Section 8.4 in EPRI report 1007820) that performance monitoring is typically part of an engineering program, which would not be part of water chemistry. In most cases, functional and performance testing verifies that component active functions can be accomplished and as such would be included as part of Maintenance Rule (10CFR50.65). Passive intended functions of pumps, heat exchangers and other components will be adequately managed by the closed cooling water chemistry program through monitoring and control of water chemistry parameters.

Enhancements

None

Operating Experience

Monthly sample results from January, 2003 through January, 2005 showed closed cooling water system chemistry parameters are maintained within EPRI acceptance criteria. Self-assessments in 2000 and 2002 determined the program is effective at maintaining low levels of contaminants in the water. One reactor building closed cooling water reading for molybdate corrosion inhibitor was within the EPRI action level 1 range; the reading was slightly low, molybdate was added and the reading returned to normal at the next sample. First and second quarter 2004 reports stated that, “the chemistry of the major closed cooling water systems remains very good and within specification.” Sample results within acceptance criteria provide evidence that the program is effective for managing loss of material, cracking, and fouling of applicable components.

Self-assessment in 2000 revealed that low triazole concentrations during 1999 were resolved by adding pure 10% triazole to CCW systems when molybdate corrosion inhibitor was high and triazole was low. Timely correction of low triazole concentrations provides assurance that the

program will ensure adequate water quality to preclude loss of material, cracking, and fouling of applicable components.

Self-assessment in 2000 revealed three instances of CCW chemistry outside administrative limits without corrective action being taken or planned. Procedure changes and trending process revisions resolved the issue, providing assurance that the program will ensure adequate water quality to preclude loss of material, cracking, and fouling of applicable components.

QA audit of implementation of the program in 2003 determined that the program is being effectively implemented. QA auditors also confirmed implementation of improvements recommended during previous program audits.

A self-assessment in 2002 and a QA audit in 2003 revealed no issues or findings that could impact effectiveness of the program.

Conclusion

The Water Chemistry Control – Closed Cooling Water Program has been effective at managing aging effects. The Water Chemistry Control – Closed Cooling Water Program provides reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B.2 REFERENCES

B.2-1 NUREG-1800, *Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants*, Revision 1, U.S. Nuclear Regulatory Commission, September 2005.

B.2-2 NUREG-1801, *Generic Aging Lessons Learned (GALL) Report,* Revision 1, U.S. Nuclear Regulatory Commission, September 2005.