CHAPTER II

CONTAINMENT STRUCTURES

Containment Structures

A. Pressurized Water Reactor (PWR) Containments

B. Boiling Water Reactor (BWR) Containments

CHAPTER II A

PRESSURIZED WATER REACTOR (PWR) CONTAINMENTS

PWR Containments

A1. Concrete Containments (Reinforced and Prestressed)

A2. Steel Containments

A3. Common Components

A1. Concrete Containments (Reinforced and Prestressed)

A1.1 Concrete Elements
A1.2 Steel Elements
A1.3 Prestressing System

A1. Concrete Containments (Reinforced and Prestressed)

Systems, Structures, and Components

Review Table II A addresses the elements of PWR containment structures. Reinforced and prestressed concrete containments, steel containments, and common components are discussed separately under subheadings A1, A2, and A3, respectively. Concrete containments in Review Table II A1 are divided into three elements: concrete, steel, and prestressing system.

System Interfaces

Functional interfaces include the primary containment HVAC system (VII.F3), containment isolation system (V.C), containment spray system (V.A), and emergency core cooling system (V.D1). Physical interfaces exist with any structure, system, or component that either penetrates the containment wall, such as the main steam system (VIII.B1) and feedwater systems (VIII.D1), or is supported by the containment structure, such as the polar crane (VII.B). The containment structure basemat typically provides support to the NSSS components and containment internal structures.

II. CONTAINMENT STRUCTURES

A. PWR Containments

A1. Concrete Containments (Reinforced and Prestressed)

Item	Structure/ Component	Region of Interest	Material	Environ-ment	Aging Effect	Aging Mechanism	References
A1.1	Concrete Elements	Dome, Wall, Basemat, Ring Girder, Buttresses	Concrete	Outside Contain-ment	Loss of Material (spalling, scaling) and Cracking	Freeze/ Thaw	10 CFR 50.55a ASME, Sect. XI, Subsection IWL
A1.1	Concrete Elements	Dome, Wall, Basemat, Ring Girder, Buttresses	Concrete	Outside Contain-ment	Increase in Porosity, Permea-bility	Leaching of Calcium Hydroxide	10 CFR 50.55a ASME, Sect. XI, Subsection IWL

II. CONTAINMENT STRUCTURES

A. PWR Containments

A1. Concrete Containments (Reinforced and Prestressed)

Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
10 CFR 50.55a/ASME Section XI, Subsection IWL	See Chapter XI.S2 for evaluation of 10 CFR 50.55a/ASME Section XI, Subsection IWL	No
10 CFR 50.55a/ASME Section XI, Subsection IWL	See Chapter XI.S2 for an evaluation of 10 CFR 50.55a/ASME Section XI, Subsection IWL, except for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.	Yes. Evaluate plant-specific program for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.

II. CONTAINMENT STRUCTURES

A. PWR Containments

A1. Concrete Containments (Reinforced and Prestressed)

Item	Structure/ Component	Region of Interest	Material	Environ-ment	Aging Effect	Aging Mechanism	References
A1.1	Concrete Elements	Dome, Wall, Basemat, Ring Girder, Buttresses	Concrete	Inside or Outside Contain-ment	Increase in Porosity and Permea-bility, Cracking, Loss of Material (spalling, scaling)	Aggressive Chemical Attack	10 CFR 50.55a ASME, Sect. XI, Subsection IWL
A1.1	Concrete Elements	Dome, Wall, Basemat, Ring Girders, Buttresses	Concrete	Inside or Outside Contain-ment	Expansion & Cracking	Reaction with Aggregates	10 CFR 50.55a ASME, Sect. XI, Subsection IWL
A1.1	Concrete Elements	Dome, Wall, Basemat; Ring Girders, Buttresses, and Reinforcing Steel	Concrete; Carbon Steel	Inside or Outside Contain-ment	Cracking, Loss of Bond, and Loss of Material (spalling, scaling)	Corrosion of Embedded Steel	10 CFR 50.55a ASME, Sect. XI, Subsection IWL

II. CONTAINMENT STRUCTURES

A. PWR Containments

A1. Concrete Containments (Reinforced and Prestressed)

Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
10 CFR 50.55a/ASME Section XI, Subsection IWL	See Chapter XI.S2 for an evaluation of 10 CFR 50.55a/ASME Section XI, Subsection IWL, except for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.	Yes. Evaluate plant-specific program for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.
10 CFR 50.55a/ASME Section XI, Subsection IWL	See Chapter XI.S2 for an evaluation of 10 CFR 50.55a/ASME Section XI, Subsection IWL	No.
10 CFR 50.55a/ASME Section XI, Subsection IWL	See Chapter XI.S2 for an evaluation of 10 CFR 50.55a/ASME Section XI, Subsection IWL, except for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.	Yes. Evaluate plant-specific program for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.

II. CONTAINMENT STRUCTURES

A. PWR Containments

A1. Concrete Containments (Reinforced and Prestressed)

Item	Structure/ Component	Region of Interest	Material	Environ-ment	Aging Effect	Aging Mechanism	References
A1.1	Concrete Elements	All	Concrete	Inside or Outside Contain-ment	Cracks; Distortion; Increase in Compo-nent Stress Level	Settlement	10 CFR 50.55a ASME Sect. XI, Subsection IWL ACI 349.3R-96
A1.1	Concrete Elements	Foundation	Concrete	Flowing Water Under Foundation	Reduction in Founda-tion Strength	Erosion of Porous Concrete Subfounda-tion	NRC IN 97-11 NRC IN 98-26
A1.1	Concrete Elements	Dome, Wall, Basemat, Ring Girder, Buttresses	Concrete	Inside or Outside Contain-ment	Loss of Strength and Modulus	Elevated Tempera-ture (>150°F general; >200°F local)	10 CFR 50.55a ASME Sect. XI, Subsection IWL ASME Sect. III, Division 2

II. CONTAINMENT STRUCTURES

A. PWR Containments

A1. Concrete Containments (Reinforced and Prestressed)

Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
Plant-Specific Program	The initial Licensing Basis for some plants included a program to monitor settlement. If no settlement was evident during the first decade or so, the NRC may have given the licensee approval to discontinue the program. However, if a de-watering system is relied upon for control of settlement, then the licensee needs to ensure proper functioning of the de-watering system through the period of extended operation.	Yes. If applicable.
Plant-Specific Program	Erosion of cement from porous concrete subfoundations beneath containment basemats is described in IN 97-11. IN 98-26 proposes Maintenance Rule Structures Monitoring for managing this aging effect, if applicable. See Chapter XI.S6 for evaluation of Structures Monitoring Program. If a de-watering system is relied upon for control of erosion of cement from porous concrete subfoundations, then the licensee needs to ensure proper functioning of the de-watering system through the period of extended operation.	Yes. If applicable.
Plant-Specific Program	The implementation of 10 CFR 50.55a and IWL would not be able to identify the loss of strength and modulus due to elevated temperature. Thus, for any portions of concrete containment that exceed specified temperature limits, further evaluations are warranted. Subsection CC-3400 of ASME Section III, Division 2, specifies the concrete temperature limits for normal operation or any other long-term period. The temperatures shall not exceed 150 ^{0}F except for local areas, such as around penetrations, which are not allowed to exceed 200 ^{0}F.	Yes. If applicable.

II. CONTAINMENT STRUCTURES

A. PWR Containments

A1. Concrete Containments (Reinforced and Prestressed)

Item	Structure/ Component	Region of Interest	Material	Environ-ment	Aging Effect	Aging Mechanism	References
A1.2	Steel Elements	Liner, Liner Anchors, Structural Steel	Carbon Steel	Inside or Outside Contain-ment	Loss of Material	Corrosion	10 CFR 50.55a ASME, Sect. XI, Subsection IWE 10 CFR Part 50, Appendix J

II. CONTAINMENT STRUCTURES

A. PWR Containments

A1. Concrete Containments (Reinforced and Prestressed)

Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
10 CFR 50.55a/ASME Section XI, Subsection IWE	See Chapter XI.S1 for evaluation of 10 CFR 50.55a/ASME Section XI, Subsection IWE, except for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.	Yes. Evaluate plant-specific program for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.
10 CFR Part 50, Appendix J (Containment Leak Rate Tests)	See Chapter XI.S4 for evaluation of 10 CFR Part 50, Appendix J	No
Protective Coating Monitoring and Maintenance Program	See Chapter XI.S8 for evaluation of Protective Coating Monitoring and Maintenance Program.	No

II. CONTAINMENT STRUCTURES

A. PWR Containments

A1. Concrete Containments (Reinforced and Prestressed)

Item	Structure/ Component	Region of Interest	Material	Environ-ment	Aging Effect	Aging Mechanism	References
A1.3	Prestress-ing System	Tendons and Anchorage Compo-nents	Carbon Steel	Inside or Outside Contain-ment	Loss of Material	Corrosion of Tendons/ Anchorage Components	10 CFR 50.55a ASME, Sect. XI, Subsection IWL NUREG-1522 NRC IN 99-10
A1.3	Prestress-ing System	Tendons and Anchorage Compo-nents	Carbon Steel	Inside or Outside Contain-ment	Loss of Prestress	Relaxation; Shrinkage; Creep; Elevated Temperature	10 CFR 50.55a ASME, Sect. XI, Subsection IWL Regulatory Guide 1.35.1

II. CONTAINMENT STRUCTURES
A. PWR Containments
A1. Concrete Containments (Reinforced and Prestressed)

Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
10 CFR 50.55a/ASME Section XI Subsection IWL (Does not apply to bonded post-tensioning systems)	See Chapter XI.S2 for an evaluation of 10 CFR 50.55a/ASME Section XI, Subsection IWL The staff notes, as documented in NUREG-1522 and IN 99-10, detrimental conditions exist in some tendon access galleries that are conducive to corrosion of tendon anchorage components. Because excessive moisture and humidity can significantly accelerate the corrosion of tendon anchorage components, managing the condition and environment in the tendon access gallery is a prudent way to manage the degradation of bearing plates and other vertical tendon anchorage components.	No
Loss Of Tendon Prestress is a TLAA.	Loss of tendon prestress is a time-limited aging analysis (TLAA) to be performed for the period of license renewal. See the Standard Review Plan, Section 4.5, "Concrete Containment Tendon Prestress" for acceptable methods for meeting the requirements of 10CFR54.21(c)(1)(i) and (ii). See Chapter X of this report for meeting the requirements of 10CFR54.21(c)(1)(iii). For periodic monitoring of prestress, see Chapter XI.S2.	Yes, TLAA

A2. Steel Containments

A2.1 Steel Elements
A2.2 Concrete Elements

A2. Steel Containments

Systems, Structures, and Components

Review Table II A addresses the elements of PWR containment structures. Reinforced and prestressed concrete containments, steel containments, and common components are discussed separately under subheadings A1, A2, and A3, respectively. Steel containments in Review Table II A2 are divided into two elements: steel and concrete.

System Interfaces

Functional interfaces include the primary containment HVAC system (VII.F3), containment isolation system (V.C), containment spray system (V.A), and emergency core cooling system (V.D1). Physical interfaces exist with any structure, system, or component that either penetrates the containment wall, such as the main steam system (VIII.B1) and feedwater systems (VIII.D1), or is supported by the containment structure, such as the polar crane (VII.B). The containment structure basemat typically provides support to the NSSS components and containment internal structures.

II. CONTAINMENT STRUCTURES

A. PWR Containments

A2. Steel Containments

Item	Structure/ Component	Region of Interest	Material	Environ-ment	Aging Effect	Aging Mechanism	References
A2.1	Steel Elements	Contain-ment Shell: Dome, Wall, Embedded Floor	Carbon Steel	Inside or Outside Contain-ment	Loss of Material	Corrosion	10 CFR 50.55a ASME, Sect. XI, Subsection IWE 10 CFR Part 50, Appendix J

II. CONTAINMENT STRUCTURES

A. PWR Containments

A2. Steel Containments

Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
10 CFR 50.55a/ASME Section XI, Subsection IWE	See Chapter XI.S1 for evaluation of 10CFR50.55a/ASME Section XI, Subsection IWE, except for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.	Yes. Evaluate plant-specific program for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.
10 CFR Part 50, Appendix J (Containment Leak Rate Tests)	See Chapter XI.S4 for evaluation of 10 CFR Part 50, Appendix J	No
Protective Coating Monitoring and Maintenance Program	See Chapter XI.S8 for evaluation of Protective Coating Monitoring and Maintenance Program.	No

II. CONTAINMENT STRUCTURES
A. PWR Containments
A2. Steel Containments

Item	Structure/ Component	Region of Interest	Material	Environ-ment	Aging Effect	Aging Mechanism	References
A2.2	Concrete Elements	Basemat	Concrete	Outside Contain-ment	Loss of Material (spalling, scaling) and Cracking	Freeze/ Thaw	10 CFR 50.55a ASME, Sect. XI, Subsection IWL
A2.2	Concrete Elements	Basemat	Concrete	Outside Contain-ment	Increase in Porosity, Permea-bility	Leaching of Calcium Hydroxide	10 CFR 50.55a ASME, Sect. XI, Subsection IWL
A2.2	Concrete Elements	Basemat	Concrete	Inside or Outside Contain-ment	Increase in Porosity and Permea-bility, Cracking, Loss of Material (spalling, scaling)	Aggressive Chemical Attack	10 CFR 50.55a ASME, Sect. XI, Subsection IWL

II. CONTAINMENT STRUCTURES
A. PWR Containments
A2. Steel Containments

Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
10 CFR 50.55a/ASME Section XI, Subsection IWL	See Chapter XI.S2 for an evaluation of 10 CFR 50.55a/ASME Section XI, Subsection IWL	No
10 CFR 50.55a/ASME Section XI, Subsection IWL	See Chapter XI.S2 for an evaluation of 10 CFR 50.55a/ASME Section XI, Subsection IWL, except for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.	Yes. Evaluate plant-specific program for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.
10 CFR 50.55a/ASME Section XI, Subsection IWL	See Chapter XI.S2 for an evaluation of 10 CFR 50.55a/ASME Section XI, Subsection IWL, except for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.	Yes. Evaluate plant-specific program for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.

II. CONTAINMENT STRUCTURES

A. PWR Containments

A2. Steel Containments

Item	Structure/ Component	Region of Interest	Material	Environ-ment	Aging Effect	Aging Mechanism	References
A2.2	Concrete Elements	Basemat	Concrete	Inside or Outside Contain-ment	Expansion & Cracking	Reaction with Aggregates	10 CFR 50.55a ASME, Sect. XI, Subsection IWL
A2.2	Concrete Elements	Basemat and Reinforcing Steel	Concrete; Carbon Steel	Inside or Outside Contain-ment	Cracking, Loss of Bond, and Loss of Material (spalling, scaling)	Corrosion of Embedded Steel	10 CFR 50.55a ASME, Sect. XI, Subsection IWL

II. CONTAINMENT STRUCTURES

A. PWR Containments

A2. Steel Containments

Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
10 CFR 50.55a/ASME Section XI, Subsection IWL	See Chapter XI.S2 for an evaluation of 10 CFR 50.55a/ASME Section XI, Subsection IWL	No.
10 CFR 50.55a/ASME Section XI, Subsection IWL	See Chapter XI.S2 for an evaluation of 10 CFR 50.55a/ASME Section XI, Subsection IWL, except for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.	Yes. Evaluate plant-specific program for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.

II. CONTAINMENT STRUCTURES
A. PWR Containments
A2. Steel Containments

Item	Structure/ Component	Region of Interest	Material	Environ-ment	Aging Effect	Aging Mechanism	References
A2.2	Concrete Elements	Basemat	Concrete	Inside or Outside Contain-ment	Cracks; Distortion; Increase in Compo-nent Stress Level	Settlement	10 CFR 50.55a ASME, Sect. XI, Subsection IWL ACI 349.3R-96
A2.2	Concrete Elements	Foundation	Concrete	Flowing Water Under Foundation	Reduction in Founda-tion Strength	Erosion of Porous Concrete Subfounda-tion	NRC IN 97-11 NRC IN 98-26
A2.2	Concrete Elements	Basemat	Concrete	Inside or Outside Contain-ment	Loss of Strength and Modulus	Elevated Tempera-ture (>150°F general; >200°F local)	10 CFR 50.55a ASME, Sect. XI, Subsection IWL ASME Sect. III, Division 2

II. CONTAINMENT STRUCTURES
A. PWR Containments
A2. Steel Containments

Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
Plant-Specific Program	The initial Licensing Basis for some plants included a program to monitor settlement. If no settlement was evident during the first decade or so, the NRC may have given the licensee approval to discontinue the program. However, if a de-watering system is relied upon for control of settlement, then the licensee needs to ensure proper functioning of the de-watering system through the period of extended operation.	Yes. If applicable.
Plant-Specific Program	Erosion of cement from porous concrete subfoundations beneath containment basemats is described in IN 97-11. IN 98-26 proposes Maintenance Rule Structures Monitoring for managing this aging effect, if applicable. See Chapter XI.S6 for evaluation of Structures Monitoring Program. If a de-watering system is relied upon for control of erosion of cement from porous concrete subfoundations, then the licensee needs to ensure proper functioning of the de-watering system through the period of extended operation.	Yes. If applicable.
Plant-Specific Program	The implementation of 10 CFR 50.55a and IWL would not be able to identify the loss of strength and modulus due to elevated temperature. Thus, for any portions of concrete containment that exceed specified temperature limits, further evaluations are warranted. Subsection CC-3400 of ASME Section III, Division 2, specifies the concrete temperature limits for normal operation or any other long-term period. The temperatures shall not exceed 150 ^{0}F except for local areas, such as around penetrations, which are not allowed to exceed 200 ^{0}F.	Yes. If applicable.

A3. Common Components

A3.1 Penetration Sleeves, Penetration Bellows, Dissimilar Metal Welds
A3.2 Personnel Airlock, Equipment Hatch
A3.3 Seals, Gaskets, and Moisture Barriers (Caulking, Flashing, and Other Sealants)

A3. Common Components

Systems, Structures, and Components

Review Table II A addresses the elements of PWR containment structures. Reinforced and prestressed concrete containments, steel containments, and common components are discussed separately under subheadings A1, A2, and A3, respectively. Common components in Review Table II A3 include penetation sleeves and bellows; dissimilar metal welds; personnel airlock; equipment hatch; and seals, gaskets, and moisture barriers.

System Interfaces

Functional interfaces include the primary containment HVAC system (VII.F3), containment isolation system (V.C), containment spray system (V.A), and emergency core cooling system (V.D1). Physical interfaces exist with any structure, system, or component that either penetrates the containment wall, such as the main steam system (VIII.B1) and feedwater systems (VIII.D1), or is supported by the containment structure, such as the polar crane (VII.B). The containment structure basemat typically provides support to the NSSS components and containment internal structures.

II. CONTAINMENT STRUCTURES

A. PWR Containments

A3. Common Components

Item	Structure/ Component	Region of Interest	Material	Environ-ment	Aging Effect	Aging Mechanism	References
A3.1	Penetration Sleeves	All	Carbon Steel, Dissimilar Metal Welds	Inside or Outside Contain-ment	Loss of Material	Corrosion	10 CFR 50.55a ASME, Sect. XI, Subsection IWE 10 CFR Part 50, Appendix J

II. CONTAINMENT STRUCTURES
A. PWR Containments
A3. Common Components

Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
10 CFR 50.55a/ASME Section XI, Subsection IWE	See Chapter XI.S1 for evaluation of 10 CFR 50.55a/ASME Section XI, Subsection IWE.	No
10 CFR Part 50, Appendix J (Containment Leak Rate Tests)	See Chapter XI.S4 for evaluation of 10 CFR Part 50, Appendix J	No
Protective Coating Monitoring and Maintenance Program	See Chapter XI.S8 for evaluation of Protective Coating Monitoring and Maintenance Program.	No

II. CONTAINMENT STRUCTURES

A. PWR Containments

A3. Common Components

Item	Structure/ Component	Region of Interest	Material	Environ-ment	Aging Effect	Aging Mechanism	References
A3.1	Penetration Sleeves, Penetration Bellows	All	Carbon Steel, Stainless Steel, Dissimilar Metal Welds	Inside or Outside Contain-ment	Cumulative Fatigue Damage	Fatigue	Design Code of Record
A3.1	Penetration Sleeves, Penetration Bellows	All	Stainless Steel and Dissimilar Metal Welds	Inside or Outside Contain-ment	Crack Initiation and Growth	Stress Corrosion Cracking, Cyclic Loading	10 CFR 50.55a ASME, Sect. XI, Subsection IWE 10 CFR Part 50, Appendix J NRC IN 92-20

II. CONTAINMENT STRUCTURES
A. PWR Containments
A3. Common Components

Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
Components have been designed or evaluated for fatigue for a 40 year design life based on postulated cycles, according to the requirements of the code of record or later approved codes.	Fatigue is a time-limited aging analysis (TLAA) to be performed for the period of license renewal. See the Standard Review Plan, Section 4.6, "Containment Liner Plate and Penetration Fatigue Analysis" for acceptable methods for meeting the requirements of 10CFR54.21(c).	Yes, TLAA
10 CFR 50.55a/ASME Section XI, Subsection IWE and 10 CFR Part 50, Appendix J	See Chapter XI.S1 for an evaluation of 10 CFR 50.55a/ASME Section XI, Subsection IWE and Chapter XI.S4 for an evaluation of 10 CFR Part 50, Appendix J. Evaluation of 10 CFR 50.55a/IWE is augmented as follows: ***(4) Detection of Aging Effects:*** Stress corrosion cracking (SCC) is a concern for dissimilar metal welds. In the case of bellows assemblies, SCC may cause aging effects particularly if the material is not shielded from a corrosive environment. Subsection IWE covers inspection of these items under examination categories E-B, E-F, and E-P (10 CFR Part 50, Appendix J pressure tests). 10 CFR 50.55a identifies examination categories E-B and E-F as optional during the current term of operation. For the extended period of operation, Examination Categories E-B & E-F, and augmented VT-1 visual examination of bellows assemblies and dissimilar welds are warranted to address this issue. For cracking due to cyclic loading of penetration sleeves and penetration bellows, VT-3 visual inspection may not detect fine cracks (one option may be to perform VT-1 visual inspections). ***(10) Operating Experience:*** IN 92-20 describes an instance of containment bellows cracking, resulting in loss of leak tightness.	Yes, Applicant's program to address Attribute (4) needs to be evaluated

II. CONTAINMENT STRUCTURES

A. PWR Containments

A3. Common Components

Item	Structure/ Component	Region of Interest	Material	Environ-ment	Aging Effect	Aging Mechanism	References
A3.2	Personnel Airlock, Equipment Hatch	All	Carbon Steel	Inside or Outside Contain-ment	Loss of Material	Corrosion	10 CFR 50.55a ASME, Sect. XI, Subsection IWE 10 CFR Part 50, Appendix J

II. CONTAINMENT STRUCTURES
A. PWR Containments
A3. Common Components

Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
10 CFR 50.55a/ASME Section XI, Subsection IWE	See Chapter XI.S1 for evaluation of 10CFR50.55a/ASME Section XI, Subsection IWE.	No
10 CFR Part 50, Appendix J (Containment Leak Rate Tests)	See Chapter XI.S4 for evaluation of 10 CFR Part 50, Appendix J	No
Protective Coating Monitoring and Maintenance Program	See Chapter XI.S8 for evaluation of Protective Coating Monitoring and Maintenance Program.	No

II. CONTAINMENT STRUCTURES

A. PWR Containments

A3. Common Components

Item	Structure/ Component	Region of Interest	Material	Environ-ment	Aging Effect	Aging Mechanism	References
A3.2	Personnel Airlock, Equipment Hatch	All	Carbon Steel	Inside or Outside Contain-ment	Fretting or Lockup	Mechanical Wear of Locks/ Hinges and Closure Mechanisms	10 CFR 50.55a ASME, Sect. XI, Subsection IWE
A3.3	Seals, Gaskets, & Moisture Barriers (caulking, flashing, and other sealants)	All	Various	Inside or Outside Contain-ment	Loss of Sealing; Leakage Through Contain-ment	Deteriora-tion of Seals, Gaskets, & Moisture Barriers (caulking, flashing, and other sealants)	10 CFR 50.55a ASME, Sect. XI, Subsection IWE 10 CFR Part 50, Appendix J

II. CONTAINMENT STRUCTURES
A. PWR Containments
A3. Common Components

Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
10 CFR 50.55a/ASME Section XI, Subsection IWE	See Chapter XI.S1 for an evaluation of 10 CFR 50.55a/ASME Section XI, Subsection IWE	No.
10 CFR 50.55a/ ASME Section XI, Subsection IWE	See Chapter XI.S1 for an evaluation of 10 CFR 50.55a/ASME Section XI, Subsection IWE Leak tightness will be monitored by 10 CFR Part 50, Appendix J Leak Rate Tests for pressure boundary, seals and gaskets (including O-rings).	No.