

Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS

A6 Group 6 Structures (Water-Control Structures)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A6-1 (T-18)	III.A6.1-d	Concrete: All	Reinforced concrete	Air – indoor Uncontrolled, or air – outdoor, or ground water/soil	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel for Reinforced concrete	Chapter XI.S7, “Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants” or the FERC / US Army Corp of Engineers dam inspections and maintenance programs. Accessible areas: As described in NUREG-1557, corrosion of exterior above-grade and interior embedded steel is not significant if the steel is not exposed to an aggressive environment (concrete pH <11.5 or chlorides >500 ppm). If such steel is exposed to an aggressive environment, corrosion is not significant if the concrete in which the steel is embedded has a low water-to-cement ratio (0.35- 0.45), adequate air entrainment (3- 6%), low permeability, and is designed in accordance with ACI 318-63 or ACI 349-85. Therefore, if these conditions are satisfied, aging management is not necessary. Inaccessible areas: For plants with non-aggressive ground water/soil; i.e., pH > 5.5, chlorides <500 ppm, or sulfates <1500 ppm, as a minimum, consider (1) Examination of the exposed portions of the below grade concrete, when excavated for any reason, and (2) Periodic monitoring of below-grade water chemistry, including consideration of potential seasonal variations. For plants with aggressive groundwater/soil, and/or where the concrete structural elements have	Yes, plant specific If environment is aggressive.	Other NUREG-1801 Structural groups and Structural Tools (Table 5-2) on page 5-24 includes aging mechanism (corrosion of embedded steel) in a ground water/soil environment. The ground water/soil environment is applicable for cracking, loss of bond, and loss of material (spalling, scaling) due to corrosion of embedded steel for reinforced concrete in water control structures. ACI 318-63 (typically used during construction of earlier nuclear plants), section 502 provides two (2) methods to determine proportions of cement, aggregate and water to attain required strength of concrete. Method 1, “without preliminary tests” and method 2, “for combinations of materials previously evaluated or to be established by trail method. The method 1 establishes water-cement ratio of 0.35 and 0.45 for 4000 psi “Air- entrained concrete” and “Non-air-entrained concrete” respectively. The method 2, allows higher water-cement ratio than method 1, provided that the relationship between strength and water-cement ratio for the material to be used has been previously established by reliable test data and the resulting concrete satisfies the

						<p>experienced degradation, a plant specific AMP accounting for the extent of the degradation experienced should be implemented to manage the concrete aging during the period of extended operation.</p>	<p>requirements of section 504.</p> <p>The range of 0.35-0.45 water-to-cement ratio currently identified in GALL it only represents ACI-318-63 (section 502) method 1 for 4000 psi concrete. It does not include the range for different strength concrete (i.e., 3000 psi concrete typically used in nuclear power plants), or provisions for use of method 2</p>
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Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS

A1 Group 1 Structures (BWR Reactor Bldg., PWR Shield Bldg., Control Rm./Bldg.)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A1-6 (T-01)	III.A1.1-a	Concrete: Exterior above- and below-grade; foundation	Reinforced concrete	Air – outdoor	Loss of material (spalling, scaling) and cracking/ freeze-thaw	<p>Chapter XI.S6, “Structures Monitoring Program ‘</p> <p>Accessible Areas: Inspections performed in accordance with the Structures Monitoring Program will indicate the presence of loss of material (spalling, scaling) and cracking due to freeze-thaw.</p> <p>Inaccessible Areas: Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index > 100 day-inch/yr) (NUREG-1557). Documented evidence to confirm that existing concrete has air content of 3% to 6% and water-to-cement ratio of 0.35-0.45 <u>in accordance with guidance provided in ACI 318</u>, and subsequent inspections did not exhibit degradation related to freeze-thaw, should be considered a part of the evaluation.</p> <p>The weathering index for the continental US is shown in ASTM C33-90, Fig.1.</p>	Yes, if not within the scope of the applicant’s structures monitoring program or for inaccessible areas of plants located in moderate to severe weathering conditions	<p>ACI 318-63 (typically used during construction of earlier nuclear plants), section 502 provides two (2) methods to determine proportions of cement, aggregate and water to attain required strength of concrete. Method 1, “without preliminary tests” and method 2, “for combinations of materials previously evaluated or to be established by trial method. The method 1 establishes water-cement ratio of 0.35 and 0.45 for 4000 psi “Air-entrained concrete” and “Non-air-entrained concrete” respectively. The method 2, allows higher water-cement ratio than method 1, provided that the relationship between strength and water-cement ratio for the material to be used has been previously established by reliable test data and the resulting concrete satisfies the requirements of section 504.</p> <p>The range of 0.35-0.45 water-to-cement ratio currently identified in GALL it only represents ACI-318-63 (section 502) method 1 for 4000 psi concrete. It does not include the range for different strength concrete (i.e., 3000 psi concrete typically used in nuclear power plants), or provisions for use of method 2 (i.e., trial mix).</p>

Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS

A2 Group 2 Structures (BWR Reactor Bldg. with Steel Superstructure)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A2-6 (T-01)	III.A2.1-a	Concrete: Exterior above- and below-grade; foundation	Reinforced concrete	Air – outdoor	Loss of material (spalling, scaling) and cracking/ freeze-thaw	<p>Chapter XI.S6, “Structures Monitoring Program”</p> <p>Accessible Areas: Inspections performed in accordance with the Structures Monitoring Program will indicate the presence of loss of material (spalling, scaling) and cracking due to freeze-thaw.</p> <p>Inaccessible Areas: Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index > 100 day-inch/yr) (NUREG-1557). Documented evidence to confirm that existing concrete has air content of 3% to 6% and water-to-cement ratio of 0.35-0.45 <u>in accordance with guidance provided in ACI 318</u>, and subsequent inspections did not exhibit degradation related to freeze-thaw, should be considered a part of the evaluation.</p> <p>The weathering index for the continental US is shown in ASTM C33-90, Fig.1.</p>	Yes, if not within the scope of the applicant’s structures monitoring program or for inaccessible areas of plants located in moderate to severe weathering conditions	<p>ACI 318-63 (typically used during construction of earlier nuclear plants), section 502 provides two (2) methods to determine proportions of cement, aggregate and water to attain required strength of concrete. Method 1, “without preliminary tests” and method 2, “for combinations of materials previously evaluated or to be established by trial method. The method 1 establishes water-cement ratio of 0.35 and 0.45 for 4000 psi “Air-entrained concrete” and “Non-air-entrained concrete” respectively. The method 2, allows higher water-cement ratio than method 1, provided that the relationship between strength and water-cement ratio for the material to be used has been previously established by reliable test data and the resulting concrete satisfies the requirements of section 504.</p> <p>The range of 0.35-0.45 water-to-cement ratio currently identified in GALL it only represents ACI-318-63 (section 502) method 1 for 4000 psi concrete. It does not include the range for different strength concrete (i.e., 3000 psi concrete typically used in nuclear power plants), or provisions for use of method 2 (i.e., trial mix).</p>

Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS

A3 Group 3 Structures (Auxiliary Bldg., Diesel Generator Bldg., Radwaste Bldg., Turbine Bldg., Switchgear Rm., Yard Structures such as AFW Pumphouse, Utility/Piping Tunnels, Security/Lighting Poles, Manholes, Duct Banks; SBO Structures such as Transmission Towers, Startup Towers Circuit Breaker foundation, Electrical Enclosure)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A3-6 (T-01)	III.A3.1-a	Concrete: Exterior above- and below-grade; foundation	Reinforced concrete	Air – outdoor	Loss of material (spalling, scaling) and cracking/ freeze-thaw	<p>Chapter XI.S6, “Structures Monitoring Program”</p> <p>Accessible Areas: Inspections performed in accordance with the Structures Monitoring Program will indicate the presence of loss of material (spalling, scaling) and cracking due to freeze-thaw.</p> <p>Inaccessible Areas: Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index > 100 day-inch/yr) (NUREG-1557). Documented evidence to confirm that existing concrete has air content of 3% to 6% and water-to-cement ratio of 0.35-0.45 in accordance with guidance provided in ACI 318, and subsequent inspections did not exhibit degradation related to freeze-thaw, should be considered a part of the evaluation.</p> <p>The weathering index for the continental US is shown in ASTM C33-90, Fig.1.</p>	Yes, if not within the scope of the applicant’s structures monitoring program or for inaccessible areas of plants located in moderate to Severe weathering conditions	<p>ACI 318-63 (typically used during construction of earlier nuclear plants), section 502 provides two (2) methods to determine proportions of cement, aggregate and water to attain required strength of concrete. Method 1, “without preliminary tests” and method 2, “for combinations of materials previously evaluated or to be established by trail method. The method 1 establishes water-cement ratio of 0.35 and 0.45 for 4000 psi “Air-entrained concrete” and “Non-air-entrained concrete” respectively. The method 2, allows higher water-cement ratio than method 1, provided that the relationship between strength and water-cement ratio for the material to be used has been previously established by reliable test data and the resulting concrete satisfies the requirements of section 504.</p> <p>The range of 0.35-0.45 water-to-cement ratio currently identified in GALL it only represents ACI-318-63 (section 502) method 1 for 4000 psi concrete. It does not include the range for different strength concrete (i.e., 3000 psi concrete typically used in nuclear power plants), or provisions for use of method 2</p>

Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS

A5 Group 5 Structures (Fuel Storage Facility, Refueling Canal)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A5-6 (T-01)	III.A5.1-a	Concrete: Exterior above- and below-grade; foundation	Reinforced concrete	Air – outdoor	Loss of material (spalling, scaling) and cracking/ freeze-thaw	<p>Chapter XI.S6, “Structures Monitoring Program”</p> <p>Accessible Areas: Inspections performed in accordance with the Structures Monitoring Program will indicate the presence of loss of material (spalling, scaling) and cracking due to freeze-thaw.</p> <p>Inaccessible Areas: Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index > 100 day-inch/yr) (NUREG-1557). Documented evidence to confirm that existing concrete has air content of 3% to 6% and water-to-cement ratio of 0.35-0.45 <u>in accordance with guidance provided in ACI 318</u>, and subsequent inspections did not exhibit degradation related to freeze-thaw, should be considered a part of the evaluation.</p> <p>The weathering index for the continental US is shown in ASTM C33-90, Fig.1.</p>	Yes, if not within the scope of the applicant’s structures monitoring program or for inaccessible areas of plants located in moderate to severe weathering condition	<p>ACI 318-63 (typically used during construction of earlier nuclear plants), section 502 provides two (2) methods to determine proportions of cement, aggregate and water to attain required strength of concrete. Method 1, “without preliminary tests” and method 2, “for combinations of materials previously evaluated or to be established by trial method. The method 1 establishes water-cement ratio of 0.35 and 0.45 for 4000 psi “Air-entrained concrete” and “Non-air-entrained concrete” respectively. The method 2, allows higher water-cement ratio than method 1, provided that the relationship between strength and water-cement ratio for the material to be used has been previously established by reliable test data and the resulting concrete satisfies the requirements of section 504.</p> <p>The range of 0.35-0.45 water-to-cement ratio currently identified in GALL it only represents ACI-318-63 (section 502) method 1 for 4000 psi concrete. It does not include the range for different strength concrete (i.e., 3000 psi concrete typically used in nuclear power plants), or provisions for use of method 2</p>

**Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS
A6 Group 6 Structures (Water-Control Structures)**

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A6-5 (T-15)	III.A6.1-a	Concrete: Exterior above and below grade; foundation	Reinforced concrete	Air – outdoor	Loss of material (spalling, scaling) and cracking/ freeze-thaw	<p>Chapter XI.S7, “Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants” or the FERC / US Army Corp of Engineers dam inspections and maintenance programs.</p> <p>Accessible Areas: Inspections performed in accordance with Chapter XI.S7, “Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants” or the FERC / US Army Corp of Engineers dam inspections and maintenance programs will indicate the presence of loss of material (spalling, scaling) and cracking due to freeze-thaw.</p> <p>Inaccessible Areas:As described in NUREG-1557, freeze-thaw does not cause loss of material from reinforced concrete in foundations, or in above- and below grade exterior concrete, for plants located in a geographic region of negligible weathering conditions (weathering index <100 day-inch/yr). Loss of material from such concrete is not significant at plants located in areas in which weathering conditions are severe (weathering index >500 day-inch/yr) or moderate (100-</p>	Yes, for inaccessible areas of plants located in moderate to severe weathering conditions	<p>ACI 318-63 (typically used during construction of earlier nuclear plants), section 502 provides two (2) methods to determine proportions of cement, aggregate and water to attain required strength of concrete. Method 1, “without preliminary tests” and method 2, “for combinations of materials previously evaluated or to be established by trial method. The method 1 establishes water-cement ratio of 0.35 and 0.45 for 4000 psi “Air-entrained concrete” and “Non-air-entrained concrete” respectively. The method 2, allows higher water-cement ratio than method 1, provided that the relationship between strength and water-cement ratio for the material to be used has been previously established by reliable test data and the resulting concrete satisfies the requirements of section 504.</p> <p>The range of 0.35-</p>

					<p>500 day-inch/yr), provided that the concrete mix design meets the air content (entrained air 3-6%) and water-to-cement ratio (0.35-0.45) specified in ACI 318-63 or ACI 349-85. Therefore, if these conditions are satisfied, aging management is not necessary</p> <p>The weathering index is defined in ASTM C33-90, Table 3, Footnote E.</p> <p>Fig. 1 of ASTM C33-90 illustrates the various weathering index regions throughout the U.S.</p>		<p>0.45 water-to-cement ratio currently identified in GALL it only represents ACI-318-63 (section 502) method 1 for 4000 psi concrete. It does not include the range for different strength concrete (i.e., 3000 psi concrete typically used in nuclear power plants), or provisions for use of method 2</p>
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**Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS
A7 Group 7 Structures (Concrete Tanks and Missile Barriers)**

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A7-5 (T-01)	III.A7.1-a	Concrete: Exterior above- and below-grade; foundation	Reinforced concrete	Air – outdoor	Loss of material (spalling, scaling) and cracking/ freeze-thaw	<p>Chapter XI.S6, “Structures Monitoring Program”</p> <p>Accessible Areas: Inspections performed in accordance with the Structures Monitoring Program will indicate the presence of loss of material (spalling, scaling) and cracking due to freeze-thaw.</p> <p>Inaccessible Areas: Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index > 100 day-inch/yr) (NUREG-1557). Documented evidence to confirm that existing concrete has air content of 3% to 6% and water-to-cement ratio of 0.35-0.45 in accordance with guidance provided in ACI 318, and subsequent inspections did not exhibit degradation related to freeze-thaw, should be considered a part of the evaluation.</p> <p>The weathering index for the continental US is shown in ASTM C33-90, Fig.1.</p>	Yes, if not within the scope of the applicant’s structures monitoring program or for inaccessible areas of plants located in moderate to severe weathering conditions	<p>ACI 318-63 (typically used during construction of earlier nuclear plants), section 502 provides two (2) methods to determine proportions of cement, aggregate and water to attain required strength of concrete. Method 1, “without preliminary tests” and method 2, “for combinations of materials previously evaluated or to be established by trial method. The method 1 establishes water-cement ratio of 0.35 and 0.45 for 4000 psi “Air-entrained concrete” and “Non-air-entrained concrete” respectively. The method 2, allows higher water-cement ratio than method 1, provided that the relationship between strength and water-cement ratio for the material to be used has been previously established by reliable test data and the resulting concrete satisfies the requirements of section 504.</p> <p>The range of 0.35-0.45 water-to-cement ratio currently identified in GALL it only represents ACI-318-63 (section 502) method 1 for 4000 psi concrete. It does not include the range for different strength concrete (i.e., 3000 psi concrete typically used in nuclear power plants), or provisions for use of method 2 (i.e., trial mix).</p>

**Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS
A8 Group 8 Structures (Steel Tanks and Missile Barriers)**

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A8-5 (T-01)	III.A8.1-a	Concrete: Exterior above- and below-grade; foundation	Reinforced concrete	Air – outdoor	Loss of material (spalling, scaling) and cracking/ freeze-thaw	<p>Chapter XI.S6, “Structures Monitoring Program”</p> <p>Accessible Areas: Inspections performed in accordance with the Structures Monitoring Program will indicate the presence of loss of material (spalling, scaling) and cracking due to freeze-thaw.</p> <p>Inaccessible Areas: Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index > 100 day-inch/yr) (NUREG-1557).</p> <p>Documented evidence to confirm that existing concrete has air content of 3% to 6% and water-to-cement ratio of 0.35-0.45 in accordance with guidance provided in ACI 318, and subsequent inspections did not exhibit degradation related to freeze-thaw, should be considered a part of the evaluation.</p> <p>The weathering index for the continental US is shown in ASTM C33-90, Fig.1.</p>	Yes, if not within the scope of the applicant’s structures monitoring program or for inaccessible areas of plants located in moderate to Severe weathering conditions	<p>ACI 318-63 (typically used during construction of earlier nuclear plants), section 502 provides two (2) methods to determine proportions of cement, aggregate and water to attain required strength of concrete. Method 1, “without preliminary tests” and method 2, “for combinations of materials previously evaluated or to be established by trial method. The method 1 establishes water-cement ratio of 0.35 and 0.45 for 4000 psi “Air-entrained concrete” and “Non-air-entrained concrete” respectively. The method 2, allows higher water-cement ratio than method 1, provided that the relationship between strength and water-cement ratio for the material to be used has been previously established by reliable test data and the resulting concrete satisfies the requirements of section 504.</p> <p>The range of 0.35-0.45 water-to-cement ratio currently identified in GALL it only represents ACI-318-63 (section 502) method 1 for 4000 psi concrete. It does not include the range for different strength concrete (i.e., 3000 psi concrete typically used in nuclear power plants), or provisions for use of method 2 (i.e., trial mix).</p>

**Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS
A9 Group 9 Structures (BWR Unit Vent Stack)**

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A9-5 (T-01)	III.A9.1-a	Concrete: Exterior above- and below-grade; foundation	Reinforced concrete	Air – outdoor	Loss of material (spalling, scaling) and cracking/ freeze-thaw	<p>Chapter XI.S6, “Structures Monitoring Program”</p> <p>Accessible Areas: Inspections performed in accordance with the Structures Monitoring Program will indicate the presence of loss of material (spalling, scaling) and cracking due to freeze-thaw.</p> <p>Inaccessible Areas: Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index > 100 day-inch/yr) (NUREG-1557).</p> <p>Documented evidence to confirm that existing concrete has air content of 3% to 6% and water-to-cement ratio of 0.35-0.45 in <u>accordance with guidance provided in ACI 318</u>, and subsequent inspections did not exhibit degradation related to freeze-thaw, should be considered a part of the evaluation.</p> <p>The weathering index for the continental US is shown in ASTM C33-90, Fig.1.</p>	Yes, if not within the scope of the applicant’s structures monitoring program or for inaccessible areas of plants located in moderate to severe weathering conditions	<p>ACI 318-63 (typically used during construction of earlier nuclear plants), section 502 provides two (2) methods to determine proportions of cement, aggregate and water to attain required strength of concrete. Method 1, “without preliminary tests” and method 2, “for combinations of materials previously evaluated or to be established by trial method. The method 1 establishes water-cement ratio of 0.35 and 0.45 for 4000 psi “Air-entrained concrete” and “Non-air-entrained concrete” respectively. The method 2, allows higher water-cement ratio than method 1, provided that the relationship between strength and water-cement ratio for the material to be used has been previously established by reliable test data and the resulting concrete satisfies the requirements of section 504.</p> <p>The range of 0.35-0.45 water-to-cement ratio currently identified in GALL it only represents ACI-318-63 (section 502) method 1 for 4000 psi concrete. It does not include the range for different strength concrete (i.e., 3000 psi concrete typically used in nuclear power plants), or provisions for use of method 2 (i.e., trial mix).</p>

Changes to GALL Report Volume 2

III STRUCTURES AND COMPONENT SUPPORTS

A1 Group 1 Structures (BWR Reactor Bldg., PWR Shield Bldg., Control Rm./Bldg.)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A1-2 (T-03)	III.A1.1-c	Concrete: All	Reinforced concrete	Any	Cracking due to expansion/ reaction with aggregates	<p>Chapter XI.S6, "Structures Monitoring Program"</p> <p>Accessible Areas: Inspections/evaluations performed in accordance with the Structures Monitoring Program will indicate the presence of expansion and cracking due to reaction with aggregates.</p> <p>Inaccessible Areas: As described in NUREG-1557, investigations, tests, and petrographic examinations of aggregates performed in accordance with ASTM C295-54 or ASTM C227-50 can demonstrate that those aggregates do not react within reinforced concrete. For potentially reactive aggregates, aggregate-reinforced concrete reaction is not significant if the concrete was constructed in accordance with ACI 318 or ACI 201.2R-77. Therefore, if these conditions are satisfied, aging management is not necessary</p>	Yes, if not within the scope of the applicant's structures monitoring program or concrete was not constructed as stated for inaccessible areas.	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS
A1 Group 1 Structures (BWR Reactor Bldg., PWR Shield Bldg., Control Rm./Bldg.)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A1-7 (T-02)	III.A1.1-b	Concrete: Exterior above- and below-grade; foundation	Reinforced concrete	Water – flowing	Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide	<p>Chapter XI.S6, "Structures Monitoring Program"</p> <p>Accessible areas: Inspections performed in accordance with the Structures Monitoring Program will indicate the presence of increase in porosity, and permeability due to leaching of calcium hydroxide.</p> <p>Inaccessible Areas: An aging management program is not necessary, even if reinforced concrete is exposed to flowing water, if there is documented evidence that confirms the in-place concrete was constructed in accordance with ACI 318 or the recommendations in ACI 201.2R-77.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS
A2 Group 2 Structures (BWR Reactor Bldg. with Steel Superstructure)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A2-7 (T-02)	III.A2.1-b	Concrete: Exterior above- and below-grade; foundation	Reinforced concrete	Water – flowing	Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide	Chapter XI.S6, "Structures Monitoring Program" Accessible areas: Inspections performed in accordance with the Structures Monitoring Program will indicate the presence of increase in porosity, and permeability due to leaching of calcium hydroxide. Inaccessible Areas: An aging management program is not necessary, even if reinforced concrete is exposed to flowing water, if there is documented evidence that confirms the in-place concrete was constructed in accordance with ACI 318 or the recommendations in ACI 201.2R-77.	Yes, if concrete was not constructed as stated for inaccessible areas	The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318. ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.

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III STRUCTURES AND COMPONENT SUPPORTS

A3 Group 3 Structures (Auxiliary Bldg., Diesel Generator Bldg., Radwaste Bldg., Turbine Bldg., Switchgear Rm., Yard Structures such as AFW Pumphouse, Utility/Piping Tunnels, Security/Lighting Poles, Manholes, Duct Banks; SBO Structures such as Transmission Towers, Startup Towers Circuit Breaker foundation, Electrical Enclosure)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A3-7 (T-02)	III.A3.1-b	Concrete: Exterior above- and below-grade; foundation	Reinforced concrete	Water – flowing	Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide	Chapter XI.S6, "Structures Monitoring Program" Accessible areas: Inspections performed in accordance with the Structures Monitoring Program will indicate the presence of increase in porosity, and permeability due to leaching of calcium hydroxide. Inaccessible Areas: An aging management program is not necessary, even if reinforced concrete is exposed to flowing water, if there is documented evidence that confirms the in-place concrete was constructed in accordance with ACI 318 or the recommendations in ACI 201.2R-77.	Yes, if concrete was not constructed as stated for inaccessible areas	The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318. ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.

Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS
A5 Group 5 Structures (Fuel Storage Facility, Refueling Canal)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A5-7 (T-02)	III.A5.1-b	Concrete: Exterior above- and below-grade; foundation	Reinforced concrete	Water – flowing	Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide	<p>Chapter XI.S6, "Structures Monitoring Program"</p> <p>Accessible areas: Inspections performed in accordance with the Structures Monitoring Program will indicate the presence of increase in porosity, and permeability due to leaching of calcium hydroxide.</p> <p>Inaccessible Areas: An aging management program is not necessary, even if reinforced concrete is exposed to flowing water, if there is documented evidence that confirms the in-place concrete was constructed in accordance with ACI 318 or the recommendations in ACI 201.2R-77.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

**Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS
A6 Group 6 Structures (Water-Control Structures)**

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A6-2 (T-17)	III.A6.1-c	Concrete: All	Reinforced concrete	Any	Cracking due to expansion/ reaction with aggregates	<p>Chapter XI.S7, "Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants" or the FERC / US Army Corp of Engineers dam inspections and maintenance programs.</p> <p>Accessible Areas: Inspections/evaluations performed in accordance with "Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants" or the FERC / US Army Corp of Engineers dam inspections and maintenance programs will indicate the presence of expansion and cracking due to reaction with aggregates.</p> <p>Inaccessible Areas: As described in NUREG-1557, investigations, tests, and petrographic examinations of aggregates performed in accordance with ASTM C295-54 or ASTM C227-50 can demonstrate that those aggregates do not react within reinforced concrete. For potentially reactive aggregates, aggregate-reinforced concrete reaction is not significant if the concrete was constructed in accordance with ACI 318 or ACI 201.2R-77. Therefore, if these conditions are satisfied, aging management is not necessary.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS
A6 Group 6 Structures (Water-Control Structures)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A6-6 (T-16)	III.A6.1-b	Concrete: Exterior above and Below grade; foundation; interior slab	Reinforced concrete	Water – flowing	Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide	<p>Chapter XI.S7, “Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants” or the FERC / US Army Corp of Engineers dam inspections and maintenance programs</p> <p>Accessible Areas: Inspections performed in accordance with Chapter XI.S7, “Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants” or the FERC / US Army Corp of Engineers dam inspections and maintenance programs will indicate the presence of increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide.</p> <p>Inaccessible Areas: As described in NUREG-1557, leaching of calcium hydroxide from reinforced concrete becomes significant only if the concrete is exposed to flowing water. Even if reinforced concrete is exposed to flowing water, such leaching is not significant if the concrete is constructed to ensure that it is dense, well-cured, has low permeability, and that cracking is well controlled. Cracking is controlled through proper arrangement and distribution of reinforcing bars. All of the above characteristics are assured if the concrete was constructed with ACI 318 or the guidance of ACI 201.2R-77. Therefore, if these conditions are satisfied, aging management is not necessary.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS
A7 Group 7 Structures (Concrete Tanks and Missile Barriers)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A7-6 (T-02)	III.A7.1-b	Concrete: Exterior above- and below-grade; foundation	Reinforced concrete	Water – flowing	Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide	<p>Chapter XI.S6, "Structures Monitoring Program"</p> <p>Accessible areas: Inspections performed in accordance with the Structures Monitoring Program will indicate the presence of increase in porosity, and permeability due to leaching of calcium hydroxide.</p> <p>Inaccessible Areas: An aging management program is not necessary, even if reinforced concrete is exposed to flowing water, if there is documented evidence that confirms the in-place concrete was constructed in accordance with ACI 318 or the recommendations in ACI 201.2R-77.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

**Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS
A8 Group 8 Structures (Steel Tanks and Missile Barriers)**

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A8-6 (T-02)	III.A8.1-b	Concrete: Exterior above- and below-grade; foundation	Reinforced concrete	Water – flowing	Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide	<p>Chapter XI.S6, "Structures Monitoring Program"</p> <p>Accessible areas: Inspections performed in accordance with the Structures Monitoring Program will indicate the presence of increase in porosity, and permeability due to leaching of calcium hydroxide.</p> <p>Inaccessible Areas: An aging management program is not necessary, even if reinforced concrete is exposed to flowing water, if there is documented evidence that confirms the in-place concrete was constructed in accordance with ACI 318 or the recommendations in ACI 201.2R-77.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS
A9 Group 9 Structures (BWR Unit Vent Stack)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A9-6 (T-02)	III.A9.1-b	Concrete: Exterior above- and below-grade; foundation	Reinforced concrete	Water – flowing	Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide	<p>Chapter XI.S6, "Structures Monitoring Program"</p> <p>Accessible areas: Inspections performed in accordance with the Structures Monitoring Program will indicate the presence of increase in porosity, and permeability due to leaching of calcium hydroxide.</p> <p>Inaccessible Areas: An aging management program is not necessary, even if reinforced concrete is exposed to flowing water, if there is documented evidence that confirms the in-place concrete was constructed in accordance with ACI 318 or the recommendations in ACI 201.2R-77.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS
A2 Group 2 Structures (BWR Reactor Bldg. with Steel Superstructure)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A2-2 (T-03)	III.A2.1-c	Concrete: All	Reinforced concrete	Any	Cracking due to expansion/ reaction with aggregates	<p>Chapter XI.S6, "Structures Monitoring Program"</p> <p>Accessible Areas: Inspections/evaluations performed in accordance with the Structures Monitoring Program will indicate the presence of expansion and cracking due to reaction with aggregates.</p> <p>Inaccessible Areas: As described in NUREG-1557, investigations, tests, and petrographic examinations of aggregates performed in accordance with ASTM C295-54 or ASTM C227-50 can demonstrate that those aggregates do not react within reinforced concrete. For potentially reactive aggregates, aggregate-reinforced concrete reaction is not significant if the concrete was constructed in accordance with ACI 318 or ACI 201.2R-77. Therefore, if these conditions are satisfied, aging management is not necessary.</p>	Yes, if not within the scope of the applicant's structures monitoring program or concrete was not constructed as stated for inaccessible areas.	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS

A3 Group 3 Structures (Auxiliary Bldg., Diesel Generator Bldg., Radwaste Bldg., Turbine Bldg., Switchgear Rm., Yard Structures such as AFW Pumphouse, Utility/Piping Tunnels, Security/Lighting Poles, Manholes, Duct Banks; SBO Structures such as Transmission Towers, Startup Towers Circuit Breaker foundation, Electrical Enclosure)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A3-2 (T-03)	III.A3.1-c	Concrete: All	Reinforced concrete	Any	Cracking due to expansion/ reaction with aggregates	<p>Chapter XI.S6, "Structures Monitoring Program"</p> <p>Accessible Areas: Inspections/evaluations performed in accordance with the Structures Monitoring Program will indicate the presence of expansion and cracking due to reaction with aggregates.</p> <p>Inaccessible Areas: As described in NUREG-1557, investigations, tests, and petrographic examinations of aggregates performed in accordance with ASTM C295-54 or ASTM C227-50 can demonstrate that those aggregates do not react within reinforced concrete. For potentially reactive aggregates, aggregate-reinforced concrete reaction is not significant if the concrete was constructed in accordance with ACI 318 or ACI 201.2R-77. Therefore, if these conditions are satisfied, aging management is not necessary.</p>	Yes, if not within the scope of the applicant's structures monitoring program or concrete was not constructed as stated for inaccessible areas.	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS

A4 Group 4 Structures (Containment Internal Structures, excluding Refueling Canal)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A4-2 (T-03)	III.A4.1-b	Concrete: All	Reinforced concrete	Any	Cracking due to expansion/ reaction with aggregates	<p>Chapter XI.S6, "Structures Monitoring Program"</p> <p>Accessible Areas: Inspections/evaluations performed in accordance with the Structures Monitoring Program will indicate the presence of expansion and cracking due to reaction with aggregates.</p> <p>Inaccessible Areas: As described in NUREG-1557, investigations, tests, and petrographic examinations of aggregates performed in accordance with ASTM C295-54 or ASTM C227-50 can demonstrate that those aggregates do not react within reinforced concrete. For potentially reactive aggregates, aggregate-reinforced concrete reaction is not significant if the concrete was constructed in accordance with ACI 318 or ACI 201.2R-77. Therefore, if these conditions are satisfied, aging management is not necessary.</p>	Yes, if not within the scope of the applicant's structures monitoring program or concrete was not constructed as stated for inaccessible areas.	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A5-2 (T-03)	III.A5.1-c	Concrete: All	Reinforced concrete	Any	Cracking due to expansion/ reaction with aggregates	<p>Chapter XI.S6, "Structures Monitoring Program"</p> <p>Accessible Areas: Inspections/evaluations performed in accordance with the Structures Monitoring Program will indicate the presence of expansion and cracking due to reaction with aggregates.</p> <p>Inaccessible Areas: As described in NUREG-1557, investigations, tests, and petrographic examinations of aggregates performed in accordance with ASTM C295-54 or ASTM C227-50 can demonstrate that those aggregates do not react within reinforced concrete. For potentially reactive aggregates, aggregate-reinforced concrete reaction is not significant if the concrete was constructed in accordance with ACI 318 or ACI 201.2R-77. Therefore, if these conditions are satisfied, aging management is not necessary</p>	Yes, if not within the scope of the applicant's structures monitoring program or concrete was not constructed as stated for inaccessible areas.	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS
A7 Group 7 Structures (Concrete Tanks and Missile Barriers)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A7-1 (T-03)	III.A7.1-c	Concrete: All	Reinforced concrete	Any	Cracking due to expansion/ reaction with aggregates	<p>Chapter XI.S6, "Structures Monitoring Program"</p> <p>Accessible Areas: Inspections/evaluations performed in accordance with the Structures Monitoring Program will indicate the presence of expansion and cracking due to reaction with aggregates.</p> <p>Inaccessible Areas: As described in NUREG-1557, investigations, tests, and petrographic examinations of aggregates performed in accordance with ASTM C295-54 or ASTM C227-50 can demonstrate that those aggregates do not react within reinforced concrete. For potentially reactive aggregates, aggregate-reinforced concrete reaction is not significant if the concrete was constructed in accordance with ACI 318 or ACI 201.2R-77. Therefore, if these conditions are satisfied, aging management is not necessary.</p>	Yes, if not within the scope of the applicant's structures monitoring program or concrete was not constructed as stated for inaccessible areas.	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A8-1 (T-03)	III.A8.1-c	Concrete: All	Reinforced concrete	Any	Cracking due to expansion/ reaction with aggregates	<p>Chapter XI.S6, "Structures Monitoring Program"</p> <p>Accessible Areas: Inspections/evaluations performed in accordance with the Structures Monitoring Program will indicate the presence of expansion and cracking due to reaction with aggregates.</p> <p>Inaccessible Areas: As described in NUREG-1557, investigations, tests, and petrographic examinations of aggregates performed in accordance with ASTM C295-54 or ASTM C227-50 can demonstrate that those aggregates do not react within reinforced concrete. For potentially reactive aggregates, aggregate-reinforced concrete reaction is not significant if the concrete was constructed in accordance with ACI 318 or ACI 201.2R-77. Therefore, if these conditions are satisfied, aging management is not necessary.</p>	Yes, if not within the scope of the applicant's structures monitoring program or concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

**Changes to GALL Report Volume 2 III STRUCTURES AND COMPONENT SUPPORTS
A9 Group 9 Structures (BWR Unit Vent Stack)**

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
III.A9-1 (T-03)	III.A9.1-c	Concrete: All	Reinforced concrete	Any	Cracking due to expansion/ reaction with aggregates	<p>Chapter XI.S6, "Structures Monitoring Program"</p> <p>Accessible Areas: Inspections/evaluations performed in accordance with the Structures Monitoring Program will indicate the presence of expansion and cracking due to reaction with aggregates.</p> <p>Inaccessible Areas: As described in NUREG-1557, investigations, tests, and petrographic examinations of aggregates performed in accordance with ASTM C295-54 or ASTM C227-50 can demonstrate that those aggregates do not react within reinforced concrete. For potentially reactive aggregates, aggregate-reinforced concrete reaction is not significant if the concrete was constructed in accordance with ACI 318 or ACI 201.2R-77. Therefore, if these conditions are satisfied, aging management is not necessary.</p>	Yes, if not within the scope of the applicant's structures monitoring program or concrete was not constructed as stated for inaccessible areas.	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77</p>

**Changes to GALL Report Volume 2 II CONTAINMENT STRUCTURES
A1 Concrete Containments (Reinforced and Prestressed)**

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
II.A1-3 (C-04)	II.A1.1-d	Concrete: Dome; wall; basemat; ring girders; buttresses	Concrete	Any	Cracking due to expansion/ reaction with aggregates	Chapter XI.S2, "ASME Section XI, Subsection IWL" Accessible Areas: Inspections performed in accordance with IWL will indicate the presence of surface cracking due to reaction with aggregates. Inaccessible Areas: As described in NUREG-1557, investigations, tests, and petrographic examinations of aggregates performed in accordance with ASTM C295-54 or ASTM C227-50 can demonstrate that those aggregates do not react within reinforced concrete. For potentially reactive aggregates, aggregate reinforced concrete reaction is not significant if the concrete was constructed in accordance with ACI 318 or ACI 201.2R-77. Therefore, if these conditions are satisfied, aging management is not necessary	Yes, if concrete was not constructed as stated for inaccessible areas	The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318. ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77

**Changes to GALL Report Volume 2 II CONTAINMENT STRUCTURES
A1 Concrete Containments (Reinforced and Prestressed)**

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
II.A1-6 (C-02)	II.A1.1-b	Concrete: Dome; wall; basemat; ring girders; buttresses	Concrete	Water – flowing	Increase in porosity, permeability/ leaching of calcium hydroxide	<p>Chapter XI.S2, “ASME Section XI, Subsection IWL”</p> <p>Accessible areas: Inspections performed in accordance with IWL will indicate the presence of increase in porosity, and permeability due to leaching of calcium hydroxide.</p> <p>Inaccessible Areas: An aging management program is not necessary, even if reinforced concrete is exposed to flowing water, if there is documented evidence that confirms the in-place concrete was constructed in accordance with ACI 318 or the recommendations in ACI 201.2R-77.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

**Changes to GALL Report Volume 2 II CONTAINMENT STRUCTURES
A2 Steel Containments**

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
II.A2-3 (C-38)	II.A2.2-d	Concrete: Basemat	Concrete	Any	Cracking due to expansion/ reaction with aggregates	<p>Chapter XI.S2, "ASME Section XI, Subsection IWL".</p> <p>Accessible Areas: Inspections performed in accordance with IWL will indicate the presence of surface cracking due to reaction with aggregates.</p> <p>Inaccessible Areas: As described in NUREG-1557, investigations, tests, and petrographic examinations of aggregates performed in accordance with ASTM C295-54 or ASTM C227-50 can demonstrate that those aggregates do not react within reinforced concrete. For potentially reactive aggregates, aggregate-reinforced concrete reaction is not significant if the concrete was constructed in accordance with ACI 318 or ACI 201.2R-77. Therefore, if these conditions are satisfied, aging management is not necessary.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

**Changes to GALL Report Volume 2 II CONTAINMENT STRUCTURES
A2 Steel Containments**

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
II.A2-6 (C-30)	II.A2.2-b	Concrete: Basemat	Concrete	Water – flowing	Increase in porosity, permeability/ leaching of calcium hydroxide	<p>Chapter XI.S2, “ASME Section XI, Subsection IWL”</p> <p>Accessible areas: Inspections performed in accordance with IWL will indicate the presence of increase in porosity, and permeability due to leaching of calcium hydroxide.</p> <p>Inaccessible Areas: An aging management program is not necessary, even if reinforced concrete is exposed to flowing water, if there is documented evidence that confirms the in-place concrete was constructed in accordance with ACI 318 or the recommendations in ACI 201.2R-77.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

**Changes to GALL Report Volume 2 II CONTAINMENT STRUCTURES
B1.2 Mark I Concrete Containments**

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
II.B1.2-4 (C-39)	II.B1.2.	Concrete: Containment; wall; basemat	Concrete	Any	Cracking due to expansion/ reaction with aggregates	<p>Chapter XI.S2, "ASME Section XI, Subsection IWL"</p> <p>Accessible Areas: Inspections performed in accordance with IWL will indicate the presence of surface cracking due to reaction with aggregates.</p> <p>Inaccessible Areas: As described in NUREG-1557, investigations, tests, and petrographic examinations of aggregates performed in accordance with ASTM C295-54 or ASTM C227-50 can demonstrate that those aggregates do not react within reinforced concrete. For potentially reactive aggregates, aggregate-reinforced concrete reaction is not significant if the concrete was constructed in accordance with ACI 318 or ACI 201.2R-77. Therefore, if these conditions are satisfied, aging management is not necessary.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

**Changes to GALL Report Volume 2 II CONTAINMENT STRUCTURES
B1.2 Mark I Concrete Containments**

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
II.B1.2-6 (C-31)	II.B1.2.	Concrete: Containment; wall; basemat	Concrete	Water – flowing	Increase in porosity, permeability/ leaching of calcium hydroxide	<p>Chapter XI.S2, “ASME Section XI, Subsection IWL”</p> <p>Accessible areas: Inspections performed in accordance with IWL will indicate the presence of increase in porosity, and permeability due to leaching of calcium hydroxide.</p> <p>Inaccessible Areas: An aging management program is not necessary, even if reinforced concrete is exposed to flowing water, if there is documented evidence that confirms the in-place concrete was constructed in accordance with ACI 318 or the recommendations in ACI 201.2R-77.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

Changes to GALL Report Volume 2 II CONTAINMENT STRUCTURES
B2.2 Mark II Concrete Containments

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
II.B2.2-4 (C-39)	II.B2.2.1-c	Concrete: Containment; wall; basemat	Concrete	Any	Cracking due to expansion/ reaction with aggregates	<p>Chapter XI.S2, "ASME Section XI, Subsection IWL"</p> <p>Accessible Areas: Inspections performed in accordance with IWL will indicate the presence of surface cracking due to reaction with aggregates.</p> <p>Inaccessible Areas: As described in NUREG-1557, investigations, tests, and petrographic examinations of aggregates performed in accordance with ASTM C295-54 or ASTM C227-50 can demonstrate that those aggregates do not react within reinforced concrete. For potentially reactive aggregates, aggregate-reinforced concrete reaction is not significant if the concrete was constructed in accordance with ACI 318 or ACI 201.2R-77. Therefore, if these conditions are satisfied, aging management is not necessary.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

Changes to GALL Report Volume 2 II CONTAINMENT STRUCTURES
B2.2 Mark II Concrete Containments

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
II.B2.2-6 (C-31)	II.B2.2.1-a	Concrete: Containment; wall; basemat	Concrete	Water – flowing	Increase in porosity, permeability/ leaching of calcium hydroxide	<p>Chapter XI.S2, “ASME Section XI, Subsection IWL”</p> <p>Accessible areas: Inspections performed in accordance with IWL will indicate the presence of increase in porosity, and permeability due to leaching of calcium hydroxide.</p> <p>Inaccessible Areas: An aging management program is not necessary, even if reinforced concrete is exposed to flowing water, if there is documented evidence that confirms the in-place concrete was constructed in accordance with ACI 318 or the recommendations in ACI 201.2R-77.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

**Changes to GALL Report Volume 2 II CONTAINMENT STRUCTURES
B3.1 Mark III Steel Containments**

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
II.B3.1-3 (C-30)	II.B3.1.2-a	Concrete: Basemat	Concrete	Water – flowing	Increase in porosity, permeability/ leaching of calcium hydroxide	<p>Chapter XI.S2, “ASME Section XI, Subsection IWL”</p> <p>Accessible areas: Inspections performed in accordance with IWL will indicate the presence of increase in porosity, and permeability due to leaching of calcium hydroxide.</p> <p>Inaccessible Areas: An aging management program is not necessary, even if reinforced concrete is exposed to flowing water, if there is documented evidence that confirms the in-place concrete was constructed in accordance with ACI 318 or the recommendations in ACI 201.2R-77.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

**Changes to GALL Report Volume 2 II CONTAINMENT STRUCTURES
B3.1 Mark III Steel Containments**

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
II.B3.1-5 (C-51)	II.B3.1.2-c	Concrete: Basemat, concrete fill-in annulus	Concrete	Any	Cracking due to expansion/ reaction with aggregate	<p>Chapter XI.S2, "ASME Section XI, Subsection IWL"</p> <p>Accessible Areas: Inspections performed in accordance with IWL will indicate the presence of surface cracking due to reaction with aggregates.</p> <p>Inaccessible Areas: As described in NUREG-1557, investigations, tests, and petrographic examinations of aggregates performed in accordance with ASTM C295-54 or ASTM C227-50 can demonstrate that those aggregates do not react within reinforced concrete. For potentially reactive aggregates, aggregate-reinforced concrete reaction is not significant if the concrete was constructed in accordance with ACI 318 or ACI 201.2R-77. Therefore, if these conditions are satisfied, aging management is not necessary.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

Changes to GALL Report Volume 2 II CONTAINMENT STRUCTURES
B3.2 Mark III Concrete Containments

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
II.B3.2-4 (C-40)	II.B3.2.1-d	Concrete: Dome; wall; basemat	Concrete	Any	Cracking due to expansion/ reaction with aggregates	<p>Chapter XI.S2, "ASME Section XI, Subsection IWL"</p> <p>Accessible Areas: Inspections performed in accordance with IWL will indicate the presence of surface cracking due to reaction with aggregates.</p> <p>Inaccessible Areas: As described in NUREG-1557, investigations, tests, and petrographic examinations of aggregates performed in accordance with ASTM C295-54 or ASTM C227-50 can demonstrate that those aggregates do not react within reinforced concrete. For potentially reactive aggregates, aggregate-reinforced concrete reaction is not significant if the concrete was constructed in accordance with ACI 318 or ACI 201.2R-77. Therefore, if these conditions are satisfied, aging management is not necessary.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

Changes to GALL Report Volume 2 II CONTAINMENT STRUCTURES
B3.2 Mark III Concrete Containments

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
II.B3.2-6 (C-32)	II.B3.2.1-b	Concrete: Dome; wall; basemat	Concrete	Water – flowing	Increase in porosity, permeability/ leaching of calcium hydroxide	<p>Chapter XI.S2, “ASME Section XI, Subsection IWL”</p> <p>Accessible areas: Inspections performed in accordance with IWL will indicate the presence of increase in porosity, and permeability due to leaching of calcium hydroxide.</p> <p>Inaccessible Areas: An aging management program is not necessary, even if reinforced concrete is exposed to flowing water, if there is documented evidence that confirms the in-place concrete was constructed in accordance with ACI 318 or the recommendations in ACI 201.2R-77.</p>	Yes, if concrete was not constructed as stated for inaccessible areas	<p>The single reference to ACI 201.2 in GALL does not include provisions for the concrete structures constructed in accordance with ACI 318.</p> <p>ACI 201.2R-77 guidance was developed after many of the earlier nuclear plants were constructed. They were constructed in accordance with ACI 318 which provided the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.</p>

Changes to GALL Report Volume 2 VII AUXILIARY SYSTEMS
G Fire Protection

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation	Basis For Change
VII.G-3 (A-21)	VII.G.2-d VII.G.5-c VII.G.3-d VII.G.4-d VII.G.1-d	Fire rated doors	Steel	Air – indoor uncontrolled	Loss of Material/ <u>Corrosion</u> , Wear	Chapter XI.M26, “Fire Protection”	No	Loss of Material due to corrosion is an applicable aging effect for steel fire doors. Currently it is not listed in the GALL for fire doors managed by the fire protection program. Reference GALL rolled-up item T-11 for same material and environment condition.
VII.G-4 (A-22)	VII.G.1-d VII.G.2-d VII.G.3-d VII.G.4-d	Fire rated doors	Steel	Air - Outdoor	Loss of Material/ <u>Corrosion</u> , Wear	Chapter XI.M26, “Fire Protection”	No	Loss of Material due to corrosion is an applicable aging effect for steel fire doors. Currently it is not listed in the GALL for fire doors managed by the fire protection program. Reference GALL rolled-up item T-11 for same material and environment condition.

Changes to GALL Report Volume 1: Table 3. Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of the GALL Report

ID	Type	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Related Generic Item	Unique Item	Basis for Change
63	BWR/ PWR	Steel fire rated doors exposed to air – outdoor or air - indoor uncontrolled	Loss of material due to <u>corrosion and wear</u>	Fire Protection	No	A-21 A-22	VII.G-3 VII.G-4	Loss of Material due to corrosion is an applicable aging effect for steel fire doors. Currently it is not listed in the GALL for fire doors managed by the fire protection program. Reference GALL rolled-up item T-11 for same material and environment condition.

**TABLE 5 Summary of Aging Management Programs for Structures and Component Supports
Evaluated in Chapters II and III of the GALL Report**

ID	Type	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Related Generic Item	Unique Item	Basis for Change
15	BWR/ PWR	Concrete elements: walls, dome, basemat, ring girder, buttresses, containment, concrete fill-in annulus (as applicable).	Cracking due to expansion and reaction with aggregate; increase in porosity, permeability due to leaching of calcium hydroxide	ISI (IWL) for accessible areas. None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 318 or ACI 201.2R-77 .	Yes, if concrete was not constructed as stated for inaccessible areas	C-02 C-04 C-30 C-31 C-32 C-38 C-39 C-40 C-51	II.A1-6 II.A1-3 II.A2-6 II.B3.1-3 II.B1.2-6 II.B2.2-6 II.B3.2-6 II.A2-3 II.B1.2-4 II.B2.2-4 II.B3.2-4 II.B3.1-5	ACI 318 provides the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.
27	BWR/ PWR	All Groups except Group 6: accessible and inaccessible interior/exterior concrete	Cracking due to expansion due to reaction with aggregates	Structures Monitoring Program. None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 318 or ACI 201.2R-77 .	Yes, if not within the scope of the applicant's structures monitoring program or concrete was not constructed as stated for inaccessible areas	T-03	III.A1-2 III.A2-2 III.A3-2 III.A4-2 III.A5-2 III.A7-1 III.A8-1 III.A9-1	ACI 318 provides the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.
32	BWR/ PWR	Groups 1-3, 5, 7-9: exterior above and below grade reinforced concrete foundations	Increase in porosity and permeability, and loss of strength due to leaching of calcium hydroxide	Structures Monitoring Program for accessible areas. None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 318 or ACI 201.2R-77 .	Yes, if concrete was not constructed as stated for inaccessible areas	T-02	III.A1-7 III.A2-7 III.A3-7 III.A5-7 III.A7-6 III.A8-6 III.A9-6	ACI 318 provides the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.

36	BWR/ PWR	Group 6: all accessible/inaccessible reinforced concrete	Cracking due to expansion/reaction with aggregates	Accessible Areas: Inspection of Water-Control Structures Associated with Nuclear Power Plants None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 318 or ACI 201.2R-77.	Yes, if concrete was not constructed as stated for inaccessible areas	T-17	III.A6-2	ACI 318 provides the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.
37	BWR/ PWR	Group 6: exterior above and below grade reinforced concrete foundation interior slab	Increase in porosity and permeability, loss of strength due to leaching of calcium hydroxide	Inspection of Water-Control Structures Associated with Nuclear Power Plants None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 318 or ACI 201.2R-77.	Yes, if concrete was not constructed as stated for inaccessible areas	T-16	III.A6-6	ACI 318 provides the requirements for design and construction of reinforced concrete structures. It included the factors for water-cement mix proportions, slump, aggregates, type of mixer, mixing time, and temperature for durable concrete which were later addressed in ACI 201.2R-77.