

Table 3.0-1 FSAR Supplement for Aging Management of Applicable Systems

GALL Chapter	GALL Program	Description of Program	Implementation Schedule*	Applicable GALL Report and SRP Chapter References
X.E1	Environmental Qualification (EQ) of Electric Components	EQ programs apply to certain electrical components that are important to safety and could be exposed to harsh environment accident conditions, as defined in 10 CFR 50.49 and Regulatory Guide 1.89, Rev.1.	Existing program	GALL VI / SRP 3.6
X.M1	Metal Fatigue of Reactor Coolant Pressure Boundary	The program monitors and tracks the number of critical thermal and pressure transients for the selected reactor coolant system components. For a set of sample of components, the program includes fatigue usage calculations that consider the effects of the reactor water environment. The program ensures the fatigue usage remaining within the allowable limit, thus minimizing fatigue cracking of metal components of the reactor coolant pressure boundary caused by anticipated cyclic strains in the material.	Existing program	GALL IV / SRP 3.1 GALL V / SRP 3.2
X.S1	Concrete Containment Tendon Prestress	The program consists of an assessment of inspections performed in accordance with the requirements of Subsection IWL of the American Society of Mechanical Engineers (ASME) Code, Section XI, as supplemented by the requirements of 10 CFR 50.55a(b)(2) (viii). The assessment related to the adequacy of the prestressing force establishes (a) acceptance criteria in accordance with U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide (RG) 1.35.1 and (b) trend lines based on the guidance provided in NRC Information Notice (IN) 99-10.	Existing program	GALL II / SRP 3.5
XI.E1	Insulation Material for Electrical Cables and	The program consists of accessible electrical cables and connections installed in adverse	First inspection for license	GALL VI / SRP 3.6

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	Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	localized environments to be visually inspected at least once every 10 years for cable and connection insulation surface anomalies, such as embrittlement, discoloration, cracking, melting, swelling, or surface contamination, that could indicate incipient conductor insulation aging degradation from heat, radiation, or moisture.	renewal completed prior to the period of extended operation	
XI.E2	Insulation Material for Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits	<p>The program consists of electrical cables and connections used in circuits with sensitive, high-voltage, low-level current signals, such as radiation monitoring and nuclear instrumentation, to be calibrated as part of the instrumentation loop calibration at the normal calibration frequency. This calibration provides sufficient indication of the need for corrective actions based on acceptance criteria related to instrumentation loop performance. The review of calibration results is performed once every 10 years.</p> <p>In cases where cables are not part of calibration or surveillance program, a proven cable test (such as insulation resistance tests, time domain reflectometry tests, or other tests judged to be effective) for detecting deterioration of the insulation system are performed. The test frequency is based on engineering evaluation and is at least once every 10 years.</p>	First review of calibration results or cable tests for license renewal completed prior to the period of extended operation	GALL VI / SRP 3.6
XI.E3	Inaccessible Power Cables Not Subject to 10 CFR 50.49 Environmental Qualification	The program call for inaccessible or underground power (greater than or equal to 480 volts) cables exposed to significant moisture to be tested at least once every 5 years to provide an indication of the condition	First tests or first inspections for license renewal completed prior to the period of	GALL VI / SRP 3.6

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	Requirements	<p>of the conductor insulation. The specific type of test performed is determined prior to the initial test, and is to be a proven test for detecting deterioration of the insulation system due to wetting. The applicant can assess the condition of the cable insulation with reasonable confidence using one or more of the following techniques: Dielectric Loss (Dissipation Factor/Power Factor), AC Voltage Withstand, Partial Discharge, Step Voltage, Time Domain Reflectometry, Insulation Resistance and Polarization Index, Line Resonance Analysis or other testing that is state-of-the-art at the time the tests are performed. Periodic exposure to moisture for more than a few days at a time is not significant for power cables that are designed for these conditions (e.g., continuous wetting or submergence are not significant for submarine cables). In addition, inspection for water collection is established and performed based on plant-specific operating experience with water accumulation in the manholes (i.e., operation of dewatering devices should be inspected and operation verified prior to any known or predicted flooding events). However, the inspection frequency is at least annual.</p>	extended operation	
XI.E4	Metal Enclosed Bus	<p>The program calls for the visual inspection of MEB internal surfaces to detect age-related degradation, including cracks, corrosion, foreign debris, excessive dust buildup, and evidence of moisture intrusion. MEB insulating material is visually inspected for signs of</p>	First inspection for license renewal completed prior to the period of extended	GALL VI / SRP 3.6

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		<p>embrittlement, cracking, chipping, melting, swelling, discoloration, or surface contamination, that may indicate overheating or aging degradation. The internal bus insulating supports are visually inspected for structural integrity and signs of cracks. MEB external surfaces are visually inspected for loss of material due to general, pitting and crevice corrosion. Accessible elastomers (e.g., gaskets, boots, and sealants) are inspected for degradation, including surface cracking, crazing, and changes in dimensions (e.g. "ballooning" and "necking"), shrinkage, discoloration, hardening and loss of strength. A sample of accessible bolted connections is inspected for increased resistance of connection by using thermography or by measuring connection resistance using a micro-ohmmeter. These inspections are performed at least once every 10 years.</p> <p>As an alternative to thermography or measuring connection resistance of accessible bolted connections covered with heat shrink tape, sleeving, insulating boots, etc., the applicant may use visual inspection of insulation material to detect surface anomalies, such as embrittlement, discoloration, cracking, chipping, melting, swelling, or surface contamination. When this alternative visual inspection is used to check bolted connections, the first inspection is completed prior to the period of extended operation and every 5 years thereafter.</p>	operation	
XI.E5	Fuse Holders	The program consists offuse holders within	First tests for	

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		<p>the scope of license renewal to be tested at least once every 10 years to provide an indication of the condition of the metallic clamp portion of the fuse holders. Testing may include thermography, contact resistance testing, or other appropriate testing methods.</p>	<p>license renewal completed prior to the period of extended operation</p>	<p>GALL VI / SRP 3.6</p>
<p>XI.E6</p>	<p>Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements</p>	<p>The program consists of a representative sample of electrical cable connections within the scope of license renewal is tested at least once prior to the period of extended operation to confirm that there are no aging effects requiring management during that period. Testing may include thermography, contact resistance testing, or other appropriate testing methods without removing the connection insulation, such as heat shrink tape, sleeving, insulating boots, etc. The one-time test provides additional confirmation to support industry operating experience that shows electrical connections have not experienced a high degree of failures and that existing installation and maintenance practices are effective.</p> <p>As an alternative to thermography or measuring connection resistance of cable connections, for the accessible cable connections that are covered with heat shrink tape, sleeving, insulating boots, etc., the applicant may use visual inspection of insulation materials to detect surface anomalies, such as embrittlement, discoloration, cracking, chipping, melting, swelling or surface contamination. When this alternative visual inspection is used to check</p>	<p>First tests for license renewal completed prior to the period of extended operation</p>	<p>GALL VI / SRP 3.6</p>

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		cable connections, the first inspection is completed prior to the period of extended operation and every 5 years thereafter.		
XI.M1	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD	The program consists of periodic volumetric, surface, and/or visual examination of ASME Class 1, 2, and 3 pressure-retaining components, including welds, pump casings, valve bodies, integral attachments, and pressure-retaining bolting for assessment, signs of degradation, and corrective actions. This program is in accordance with the ASME Code Section XI edition and addenda approved in accordance with provisions of 10 CFR 50.55a during the period of extended operation.	Existing program	GALL IV / SRP 3.1 GALL V / SRP 3.2 GALL VII / SRP 3.3 GALL VIII / SRP 3.4
XI.M2	Water Chemistry	This program mitigates aging effects of loss of material due to corrosion, cracking due to stress corrosion cracking (SCC) and related mechanisms, and reduction of heat transfer due to fouling in components exposed to a treated water environment. Chemistry programs are used to control water chemistry for impurities (e.g., chloride, fluoride, and sulfate) that accelerate corrosion. This program relies on monitoring and control of water chemistry to keep peak levels of various contaminants below the system-specific limits based on EPRI guidelines.	Existing program	GALL IV / SRP 3.1 GALL V / SRP 3.2 GALL VII / SRP 3.3 GALL VIII / SRP 3.4 GALL III / SRP 3.5
XI.M3	Reactor Head Closure Stud Bolting	This program includes (a) inservice inspection ISI in conformance with the requirements of the ASME Code, Section XI, Subsection IWB, Table IWB-2500-1, and (b) preventive measures to mitigate cracking. The program also relies on recommendations to address	Existing program	GALL IV / SRP 3.1

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		reactor head stud bolting degradation as delineated in NUREG-1339 and NRC Regulatory Guide (RG) 1.65.		
XI.M4	BWR Vessel ID Attachment Welds	The program includes (a) inspection and flaw evaluation in conformance with the guidelines of staff-approved boiling water reactor vessel and internals project (BWRVIP) -48, and (b) monitoring and control of reactor coolant water chemistry in accordance with the guidelines of BWRVIP-190 (EPRI TR-1016579).	Existing program	GALL IV / SRP 3.1
XI.M5	BWR Feedwater Nozzle	This program includes (a) enhancing inservice inspection (ISI) specified in the American Society of Mechanical Engineers (ASME) Code, Section XI, with the recommendation of General Electric (GE) NE-523-A71-0594 to perform periodic ultrasonic testing inspection of critical regions of the BWR feedwater nozzle.	Existing program	GALL IV / SRP 3.1
XI.M6	BWR Control Rod Drive Return Line Nozzle	The program includes mandatory in-service inspection in accordance with ASME Code Section XI, Subsection IWB, Table IWB 2500-1 and augmented ISI examinations in accordance with applicant's commitments to Generic Letter 80-095 to implement the recommendations in NUREG-0619.	Program should be implemented prior to period of extended operation	GALL IV / SRP 3.1
XI.M7	BWR Stress Corrosion Cracking	The program to manage intergranular stress corrosion cracking (IGSCC) in boiling water reactor (BWR) coolant pressure boundary piping made of stainless steel (SS) is delineated in NUREG-0313, Rev. 2, and Nuclear Regulatory Commission (NRC) Generic Letter (GL) 88-01 and its Supplement 1. The program includes (a) preventive measures to mitigate IGSCC,	Existing program	GALL IV / SRP 3.1 GALL V / SRP 3.2 GALL VII / SRP 3.3

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		and (b) inspections to monitor IGSCC and its effects.		
XI.M8	BWR Penetrations	The program includes (a) inspection and flaw evaluation in conformance with the guidelines of staff-approved boiling water reactor vessel and internals project (BWRVIP)-49A and BWRVIP-27A documents, and (b) monitoring and control of reactor coolant water chemistry in accordance with the guidelines of BWRVIP-190 (EPRI TR-1016579) to ensure the long-term integrity and safe operation of boiling water reactor (BWR) vessel internal components.	Existing program	GALL IV / SRP 3.1
XI.M9	BWR Vessel Internals	<p>The program includes (a) inspection and flaw evaluation in conformance with the guidelines of applicable and staff-approved boiling water reactor vessel and internals project (BWRVIP) documents, and (b) monitoring and control of reactor coolant water chemistry in accordance with the guidelines of BWRVIP-190 (EPRI TR-1016579) to ensure the long-term integrity and safe operation of boiling water reactor (BWR) vessel internal components.</p> <p>This program also consists of (1) determination of the susceptibility of cast austenitic stainless steel components, (2) accounting for the synergistic effect of thermal aging and neutron irradiation, and (3) implementing a supplemental examination program, as necessary.</p> <p>This program also addresses aging degradation of X-750 alloy, and precipitation-</p>	Existing program	GALL IV / SRP 3.1

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		hardened (PH) martensitic stainless steel (e.g., 15-5 and 17-4 PH steel) materials and martensitic stainless steel (e.g., 403, 410, 431 steel) that are used in BWR vessel internal components.		
XI.M10	Boric Acid Corrosion	The program consists of (a) visual inspection of external surfaces that are potentially exposed to borated water leakage, (b) timely discovery of leak path and removal of the boric acid residues, (c) assessment of the damage, and (d) follow up inspection for adequacy. This program is implemented in response to GL 88-05 and recent operating experience.	Existing program	GALL IV / SRP 3.1 GALL V / SRP 3.2 GALL VII / SRP 3.3 GALL VIII / SRP 3.4 GALL III / SRP 3.5
XI.M11B	Cracking of Nickel-Alloy Components and Loss of Material due to Boric Acid-Induced Corrosion in Reactor Coolant Pressure Boundary Components (PWRs only)	This program addresses cracking of nickel-alloy components and loss of material due to boric acid-induced corrosion in susceptible, safety-related components in the vicinity of nickel-alloy reactor coolant pressure boundary components. It provides (a) inspection requirements for the pressurized water reactor (PWR) vessel, steam generator, pressurizer components and piping if they contain the primary water stress corrosion cracking (PWSCC) susceptible materials designated alloys 600/82/182, and (b) inspection requirements for reactor pressure vessel upper heads.	Program should be implemented prior to period of extended operation	GALL IV / SRP 3.1
XI.M12	Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)	The program consists of the determination of the susceptibility of CASS piping, piping components, and piping elements in PWR ECCS systems including interfacing pipe lines to the chemical and volume control system	Existing program	GALL IV / SRP 3.1 GALL V / SRP 3.2

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		and to the spent fuel pool; and in BWR ECCS systems including interfacing pipe lines to the suppression chamber and to the drywell and suppression chamber spray system in regard to thermal aging embrittlement based on the casting method, molybdenum content, and ferrite percentage. For potentially susceptible piping, aging management is accomplished either through enhanced volumetric examination or component-specific flaw tolerance evaluation.		
XI.M16A	PWR Vessel Internals	<p>The program relies on implementation of the Electric Power Research Institute (EPRI) Report No. 1016596 (MRP-227) and EPRI Report No. 1016609 (MRP-228) to manage the aging effects on the reactor vessel internal (RVI) components.</p> <p>The program includes (1) Examinations and other inspections, and comparison of these data with examination acceptance criteria, as defined in MRP-227, Revision 0 and MRP-228, Revision 0; (2) Disposition of indications that exceed examination acceptance criteria by entering them into the Corrective Action Program and may include evaluation for continued service until the next examination; and (3) Monitoring and control of reactor primary coolant water chemistry for pressurized water reactors (PWRs), which relies on monitoring and control of reactor water chemistry based on industry guidelines such as EPRI 1014986 (PWR Primary Water Chemistry Guidelines-Revision 6) and EPRI 1016555 (PWR Secondary Water Chemistry</p>	Program should be implemented prior to period of extended operation	GALL IV / SRP 3.1

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		<p>Guidelines-Revision 7.</p> <p>This program is used to manage (a) various forms of cracking, including stress corrosion cracking (SCC), primary water stress corrosion cracking (PWSCC), irradiation-assisted stress corrosion cracking (IASCC), or cracking due to fatigue/cyclical loading; (b) loss of material induced by wear; (c) loss of fracture toughness due to either thermal aging or neutron irradiation embrittlement; (d) dimensional changes and potential loss of fracture toughness due to void swelling and irradiation growth; and (e) loss of preload due to thermal and irradiation-enhanced stress relaxation or creep.</p>		
XI.M17	Flow-Accelerated Corrosion (FAC)	<p>The program consists of (a) conducting appropriate analysis and baseline inspections, (b) determining the extent of thinning, and replace/repair of components, and (c) performing follow-up inspections to confirm or quantify and take long-term corrective actions. The program relies on implementation of EPRI guidelines of NSAC-202L-R2 or R3..</p>	Existing program	<p>GALL IV / SRP 3.1</p> <p>GALL V / SRP 3.2</p> <p>GALL VIII / SRP 3.4</p>
XI.M18	Bolting Integrity	<p>This program focuses on closure bolting for pressure retaining components and relies on recommendations for a comprehensive bolting integrity program, as delineated in NUREG-1339, and industry recommendations, as delineated in the Electric Power Research Institute (EPRI) NP-5769, with the exceptions noted in NUREG-1339 for safety-related bolting. The program also relies on industry recommendations for comprehensive bolting maintenance, as delineated in the EPRI TR-</p>	Existing program	<p>GALL IV / SRP 3.1</p> <p>GALL V / SRP 3.2</p> <p>GALL VII / SRP 3.3</p> <p>GALL VIII / SRP 3.4</p>

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		<p>104213.</p> <p>The program generally includes periodic inspection of closure bolting for indications of loss of preload, cracking, and loss of material due to corrosion, rust, etc. The program also includes preventive measures to preclude or minimize loss of preload and cracking.</p> <p>A related aging management program (AMP) XI.M1, "ASME Section XI Inservice Inspection (ISI) Subsections IWB, IWC, and IWD" includes inspections of safety-related and non-safety-related closure bolting and supplements this bolting integrity program. Other related programs, AMPs XI.S1, "ASME Section XI, Subsection IWE"; XI.S3, "ASME Section XI Subsection IWF," and XI.M23, "Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems," manage the inspection of safety-related and non-safety related structural bolting.</p>		
XI.M19	Steam Generators	This program consists of aging management activities for the steam generator tubes, plugs, sleeves, and secondary side components that are contained within the steam generator in accordance with the plant technical specifications and includes commitments to NEI 97-06.	Existing program	GALL IV / SRP 3.1
XI.M20	Open-Cycle Cooling Water System	The program includes (a) surveillance and control of biofouling, (b) tests to verify heat transfer, (c) routine inspection and maintenance program, (d) system walk down	Existing program	GALL V / SRP 3.2 GALL VII / SRP 3.3

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		inspection, and (e) review of maintenance, operating, and training practices and procedures. The program provides assurance that the open-cycle cooling water system is in compliance with General Design Criteria and Quality Assurance to ensure that the open-cycle cooling water (or service water) system can be managed for an extended period of operation. This program is in response to NRC GL 89-13.		GALL VIII / SRP 3.4
XI.M21A	Closed Treated Cooling Water Systems	The program includes (a) water treatment, including the use of corrosion inhibitors, to modify the chemical composition of the water such that the function of the equipment is maintained and such that the effects of corrosion are minimized; (b) chemical testing of the water to ensure that the water treatment program maintains the water chemistry within acceptable guidelines; and (c) inspections to determine the presence or extent of corrosion and/or cracking.	Program should be implemented prior to period of extended operation	GALL VII / SRP 3.3 GALL VIII / SRP 3.4
XI.M22	Boraflex Monitoring	The program consists of (a) neutron attenuation testing ("blackness testing") to determine gap formation, (b) sampling for the presence of silica in the spent fuel pool along with boron loss, and (c) monitoring and analysis of criticality to assure that the required 5% sub-criticality margin is maintained. This program is implemented in response to GL 96-04.	Existing program	GALL VII / SRP 3.3
XI.M23	Inspection of Overhead Heavy Load and Light Load Handling Related to Refueling) Handling Systems	The program evaluates the effectiveness of the maintenance monitoring program and the effects of past and future usage on the structural reliability of cranes and hoists. The number and magnitude of lifts made by the	Existing program	GALL VII / SRP 3.3

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		hoist or crane are also reviewed. Rails and girders are visually inspected on a routine basis for degradation; functional tests are performed to assure their integrity. These cranes must also comply with the maintenance rule requirements provided in 10 CFR 50.65.		
XI.M24	Compressed Air Monitoring	The program consists of monitoring moisture content and corrosion, and performance of the entire system, including (a) frequent leak testing of system pressure boundary; (b) preventive monitoring of water (moisture), and other contaminants to keep within the specified limits; and (c) inspection of components for indications of loss of material due to corrosion. This program is in response to NRC GL 88-14 and INPO's Significant Operating Experience Report (SOER) 88-01. It also relies on the ASME OM Guide Part 17, and ISA-S7.0.1-1996 as guidance for testing and monitoring air quality and moisture.	Existing program	GALL VII / SRP 3.3
XI.M25	BWR Reactor Water Cleanup System	This program includes inservice inspection (ISI) and monitoring and control of reactor coolant water chemistry. Related to the inspection guidelines for RWCU piping welds outboard of the second isolation valve, the program includes measures delineated in NUREG-0313, Revision 2, and NRC Generic Letter (GL) 88-01 and ISI in conformance with the American Society of Mechanical Engineers (ASME) Section XI.	Existing program	GALL VII, SRP 3.3
XI.M26	Fire Protection	The program includes fire barrier inspections. The fire barrier inspection program requires periodic visual inspection of fire barrier penetration seals, fire barrier walls, ceilings,	Existing program	GALL VII / SRP 3.3

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		and floors, and periodic visual inspection and functional tests of fire rated doors to ensure that their operability is maintained.. The program also includes periodic inspection and test of halon/carbon dioxide fire suppression systems.		
XI.M27	Fire Water System	This program consists of periodic full flow flush tests, system performance tests to prevent corrosion from biofouling components in the fire protection system and testing or replacement of sprinklers that have been in place for 50 years. The system is normally maintained at required operating pressure and is monitored such that loss of system pressure is immediately detected and corrective actions initiated. The program relies on testing of piping and components in the water-based fire protection system in accordance with applicable NFPA commitments. In addition, this program can be modified to include (a) portions of the fire protection sprinkler system that are subjected to full flow tests prior to the period of extended operation, and (b) portions of the fire protection system exposed to water are internally visually inspected.	Program should be implemented prior to period of extended operation	GALL VII / SRP 3.3
XI.M29	Aboveground Metallic Tanks	This program includes preventive measures to mitigate corrosion by protecting the external surfaces of steel components, per standard industry practice, with sealant or caulking at the concrete-component interface. Visual inspection during periodic system walk downs should be sufficient to monitor degradation of the protective paint, coating, calking, or sealant. Program effectiveness is determined	Existing program	GALL VII / SRP 3.3

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		by measuring the thickness of the tank bottoms to ensure that significant degradation is not occurring and that the component's intended function is maintained during the period of extended operation.		
XI.M30	Fuel Oil Chemistry	The program relies on a combination of surveillance and maintenance procedures. Monitoring and controlling fuel oil contamination in accordance with the guidelines of ASTM Standards D1796, D2276, D2709, and D4057 maintains the fuel oil quality. Exposure to fuel oil contaminants, such as water and microbiological organisms, is minimized by periodic cleaning/draining of tanks and by verifying the quality of new oil before its introduction into the storage tanks.	Existing program	GALL VII / SRP 3.3
XI.M31	Reactor Vessel Surveillance	This program, extending the scope of 10 CFR Part 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements" provides sufficient material data and dosimetry to monitor irradiation embrittlement at the end of the period of extended operation, and to determine the need for operating restrictions on the inlet temperature, neutron spectrum, and neutron flux. If surveillance capsules are not withdrawn during the period of extended operation, operating restrictions are to be established to ensure that the plant is operated under the conditions to which the surveillance capsules were exposed. All capsules in the reactor vessel that are removed and tested must meet the test procedures and reporting requirements of ASTM E 185-82 to the extent practicable for the configuration of the specimens in the	The surveillance capsule withdrawal schedule revised before the period of extended operation	GALL IV / SRP 3.1

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		capsule. Any changes to the capsule withdrawal schedule, including spare capsules, must be approved by the NRC prior to implementation. Untested capsules placed in storage must be maintained for future insertion.		
XI.M32	One-Time Inspection	<p>The program consists of a one-time inspection of selected components to verify the system-wide effectiveness of an aging management program (AMP) that is designed to prevent or minimize aging to the extent that it will not cause the loss of intended function during the period of extended operation. This program provides inspections that verify that unacceptable degradation is not occurring. It also may trigger additional actions that ensure the intended functions of affected components are maintained during the period of extended operation.</p> <p>The elements of the program include (a) determination of the sample size of components to be inspected based on an assessment of materials of fabrication, environment, plausible aging effects, and operating experience, (b) identification of the inspection locations in the system or component based on the potential for the aging effect to occur, (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect for which the component is examined, and (d) an evaluation of the need for follow-up examinations to monitor the</p>	Program should be implemented prior to period of extended operation	<p>GALL IV / SRP 3.1</p> <p>GALL V / SRP 3.2</p> <p>GALL VII / SRP 3.3</p> <p>GALL VIII / SRP 3.4</p>

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		<p>progression of aging if age-related degradation is found that could jeopardize an intended function before the end of the period of extended operation.</p> <p>This program cannot be used for structures or components with known age-related degradation mechanisms or when the environment in the period of extended operation is not expected to be equivalent to that in the prior 40 years. Periodic inspections should be proposed in these cases.</p>		
XI.M33	Selective Leaching	<p>The program includes a hardness measurement of selected components that may be susceptible to selective leaching to determine whether loss of materials is occurring and whether the process will affect the ability of the components to perform their intended function for the period of extended operation. For systems subjected to environments where water is not treated (i.e., the open-cycle cooling water system and the ultimate heat sinks), the program also follows the guidance in NRC GL 89-13.</p>	<p>Program should be implemented prior to period of extended operation</p>	<p>GALL IV / SRP 3.1                      GALL V / SRP 3.2                      GALL VII / SRP 3.3                      GALL VIII / SRP 3.4</p>
XI.M35	One-Time Inspection of ASME Code Class 1 Small Bore-Piping	<p>This program augments the existing ASME Code, Section XI requirements and is applicable to small-bore ASME Code Class 1 piping and systems with a nominal pipe size diameter less than 4 inches (NPS&lt;4). This program provides a one-time volumetric inspection of a sample of this Class 1 piping. The program includes pipes, fittings, branch connections, and all full and partial penetration (socket) welds. The program includes measures to verify that degradation</p>	<p>Program should be implemented prior to period of extended operation</p>	<p>GALL IV / SRP 3.1</p>

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		is not occurring, thereby either confirming that there is no need to manage aging-related degradation or validating the effectiveness of any existing program for the period of extended operation. The one-time inspection program for ASME Code Class 1 small-bore piping includes locations that are susceptible to cracking. This program is applicable only to plants that have not experienced cracking of ASME Code Class 1 small-bore piping resulting from stress corrosion or cyclical (including thermal, mechanical, and vibratory) loading. Should evidence of cracking of ASME Code Class 1 small-bore piping be revealed by a one-time inspection or previous operating experience, periodic inspection is proposed, as managed by a plant-specific program.		
XI.M36	External Surfaces Monitoring of Mechanical Components	This program is based on system inspections and walkdowns. This program consists of periodic visual inspections of metallic and polymeric components such as piping, piping components, ducting, polymeric components, and other components. The program manages aging effects through visual inspection of external surfaces for evidence of loss of material, cracking, and change in material properties. When appropriate for the component and material, manipulation may be used to augment visual inspection to confirm the absence of elastomer hardening and loss of strength.	Existing program	GALL V / SRP 3.2 GALL VII / SRP 3.3 GALL VIII / SRP 3.4
XI.M37	Flux Thimble Tube Inspection	The program inspects for the thinning of flux thimble tube walls, which provides a path for the in-core neutron flux monitoring system detectors and forms part of the reactor coolant	Existing Program	GALL IV / SRP 3.1

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GALL Chapter	GALL Program	Description of Program	Implementation Schedule*	Applicable GALL Report and SRP Chapter References
		system (RCS) pressure boundary. Flux thimble tubes are subject to loss of material at certain locations in the reactor vessel where flow-induced fretting causes wear at discontinuities in the path from the reactor vessel instrument nozzle to the fuel assembly instrument guide tube. A nondestructive examination methodology, such as eddy current testing (ECT), or other applicant-justified and US NRC-accepted inspection methods are used to monitor flux thimble tube wear. This program implements the recommendations of NRC Bulletin 88-09, "Thimble Tube Thinning in Westinghouse Reactors."		
XI.M38	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components	The program consists of inspections of the internal surfaces of metallic piping, piping components, ducting, polymeric components, and other components and any water systems other than open-cycle cooling water, treated water, and fire water that are exposed to environments of air – indoor, uncontrolled; air – outdoor; condensation;. These internal inspections are performed during the periodic system and component surveillances or during the performance of maintenance activities when the surfaces are made accessible for visual inspection. The program includes visual inspections to ensure that existing environmental conditions are not causing material degradation that could result in a loss of the component's intended function. For certain materials such as polymers, physical manipulation or pressurization (e.g., hydrotesting) to detect	Existing program	GALL V / SRP 3.2 GALL VII / SRP 3.3 GALL VIII / SRP 3.4 GALL VI / SRP 3.6

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GALL Chapter	GALL Program	Description of Program	Implementation Schedule*	Applicable GALL Report and SRP Chapter References
		hardening or loss of strength is used to augment the visual examinations conducted under this program. If visual inspection of internal surfaces is not possible, then the applicant needs to provide a plant-specific program.		
XI.M39	Lubricating Oil Analysis	This program ensures the oil environment in the mechanical systems is maintained to the required quality. The program ensures that oil systems are maintained free of contaminants (primarily water and particulates), thereby preserving an environment that is not conducive to loss of material, cracking, or reduction of heat transfer. Testing activities include sampling and analysis of lubricating oil for detrimental contaminants. The presence of water or particulates may also indicate in-leakage and corrosion product buildup.	Existing program	GALL V / SRP 3.2 GALL VII / SRP 3.3 GALL VIII / SRP 3.4
XI.M40	Monitoring of Neutron-Absorbing Materials other than Boraflex	This program relies on periodic inspection, testing, monitoring, and analysis of the criticality design to assure that the required 5 percent sub-criticality margin is maintained.	Program should be implemented prior to period of extended operation	GALL VII / SRP 3.3
XI.M41	Buried, Underground, and Limited-Access Piping and Tanks	This comprehensive program is designed to manage the aging of the external surfaces of buried and limited-access piping and tanks. It addresses piping and tanks composed of any material, including metallic, polymeric, and cementitious materials. The program manages aging through preventive, mitigative and inspection activities. It manages all applicable aging effects such as loss of material, cracking, and changes in material properties.	Inspections to be completed before the period of extended operation	GALL V / SRP 3.2 GALL VII / SRP 3.3 GALL VIII / SRP 3.4

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GALL Chapter	GALL Program	Description of Program	Implementation Schedule*	Applicable GALL Report and SRP Chapter References
XI.S1	ASME Section XI, Subsection IWE Inservice Inspection (IWE)	The ASME Section XI, Subsection IWE program consists of periodic visual, surface, and volumetric inspection of pressure-retaining components of steel and concrete containments for signs of degradation, assessment of damage, and corrective actions. The program also includes aging management for the potential loss of material due to corrosion in the inaccessible areas of the boiling water reactor (BWR) Mark I steel containment, and surface examination for the detection of cracking of structural bolting. This program is in accordance with ASME Section XI, Subsection IWE, 2004 edition.	Existing program	GALL II / SRP 3.5
XI.S2	ASME Section XI, Subsection IWL Inservice Inspection (IWL)	The ASME Section XI, Subsection IWL program consists of (a) periodic visual inspection of concrete surfaces for reinforced and prestressed concrete containments, (b) periodic visual inspection and sample tendon testing of unbonded post-tensioning systems for prestressed concrete containments for signs of degradation, assessment of damage, and corrective actions, and testing of the tendon corrosion protection medium and free water. Measured tendon lift-off forces are compared to predicted tendon forces calculated in accordance with RG 1.35.1. This program is in accordance with ASME Section XI, Subsection IWL, 2004 edition.	Existing program	GALL II / SRP 3.5
XI.S3	ASME Section XI, Subsection IWF Inservice inspection(IWF)	This program consists of periodic visual examination of component supports and high-strength structural bolting for signs of degradation, evaluation, and corrective	Existing program	GALL II / SRP 3.5 GALL III / SRP 3.5

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GALL Chapter	GALL Program	Description of Program	Implementation Schedule*	Applicable GALL Report and SRP Chapter References
		actions. This program is in accordance with ASME Section XI, Subsection IWF, 20012004 edition including the 2002 and 2003 Addenda.		
XI.S4	10 CFR Part 50, Appendix J	This program consists of monitoring leakage rates through containment liner/welds, penetrations, fittings, and other access openings to detect degradation of the containment pressure boundary. Corrective actions are taken if leakage rates exceed acceptance criteria. This program is implemented in accordance with 10 CFR Part 50 Appendix J, RG 1.163 and NEI 94-01, Rev. 0.	Existing program	GALL II / SRP 3.5
XI.S5	Masonry Walls	The program consists of inspections, based on IE Bulletin 80-11 and plant-specific monitoring proposed by IN 87-67, for managing loss of material and cracking of masonry walls.	Existing program	GALL III / SRP 3.5
XI.S6	Structures Monitoring	The program consists of periodic inspection and monitoring the condition of structures and structure component supports to ensure that aging degradation leading to loss of intended functions will be detected and that the extent of degradation can be determined. This program is implemented in accordance with NUMARC 93-01, Rev. 2 and RG 1.160, Rev. 2.	Existing program	GALL VII / SRP 3.3 GALL II / SRP 3.5 GALL III / SRP 3.5 GALL VI / SRP 3.5
XI.S7	R.G. 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants	The program consists of inspection and surveillance program for dams, slopes, canals, intake structure and other water-control structures associated with emergency cooling water systems or flood protection based on RG 1.127, Rev. 1. The program also includes structural steel and structural bolting	Existing program	GALL III / SRP 3.5

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GALL Chapter	GALL Program	Description of Program	Implementation Schedule*	Applicable GALL Report and SRP Chapter References
		associated with water-control structures, steel or wood piles and sheeting required for the stability of embankments and channel slopes, and miscellaneous steel, such as sluice gates and trash racks.		
XI.S8	Protective Coating Monitoring and Maintenance	This program consists of guidance for selection, application, inspection, and maintenance of protective coatings. This program is implemented in accordance with RG 1.54, Rev. 1 or latest revision.	Existing program	GALL III / SRP 3.5
GALL Appendix A	Quality Assurance	The 10 CFR Part 50, Appendix B quality assurance program provides for corrective actions, the confirmation process, and administrative controls for AMPs for license renewal. The scope of this existing program is expanded to include non safety-related structures and components that are subject to an AMR for license renewal.	Existing program	GALL VIII / SRP 3.4 GALL III / SRP 3.5 GALL VI / SRP 3.6
SRP Appendix A	Plant-Specific AMP	The program should contain information associated with the bases for determining that aging effects will be managed during the period of extended operation.	Program should be implemented prior to period of extended operation	GALL IV / SRP 3.1 GALL V / SRP 3.2 GALL VII / SRP 3.3 GALL VIII / SRP 3.4 GALL II-III / SRP 3.5 GALL VI / SRP 3.6
<p>* An applicant need not incorporate the implementation schedule into its FSAR. However, the reviewer should verify that the applicant has identified and committed in the license renewal application to any future aging management activities to be completed before the period of extended operation. The staff expects to impose a license condition on any renewed license to ensure that the applicant will complete these activities no later than the committed date.</p>				