Approach to License Renewal Topics

A number of License Renewal topics have received industry or regulatory interest. Relevancy of some of these topics to License Renewal warrants their separate listing and discussion in Table 1 below, with reference to where additional information can be found in the Monticello License Renewal Application (LRA). Some topics were raised by the NRC Staff during their review of other utility applications, and others have been the subject of NRC Interim Staff Guidance (ISG) or discussion at industry working groups. NMC's position on ISGs is provided in Section 2.1.4.3 of the LRA.

Where necessary, site specific studies and special investigations were conducted to establish a consistent approach with sufficient technical bases to address each topic. The results of these studies and investigations are included in a series of MNGP LR Technical Reports (LR-TRs), Aging Management Review (AMR) Reports and other project documents.

Table 1: License Renewal Topics

Topic	Approach	LRA Section(s)
Scoping:		
Safety-Related SSCs and 10 CFR 54.4(a)(1) [1.1]	Systems, Structures and Components (SSCs) required to perform the functions of 10 CFR 54.4(a)(1) for Design Basis Events were included in-scope for License Renewal (regardless of their CLB safety classification).	Section 2.1.4.2.1
Design Basis Events [1.2]	Design Basis Events are defined in the Current License Basis (CLB) and are contained in Chapter 14 of the Monticello Updated Safety Analysis.	Section 2.1.3.2
Use of Current License Basis in Scoping Determinations [1.3]	The Current License Basis, in accordance with 10 CFR 54.3, was used to ensure all plant systems and structures were evaluated for LR scoping.	Section 2.1.3.1 Section 2.1.4.1
NUREG-1801 Scoping and Screening Guidance [1.4]	Scoping and screening methodology is consistent with guidance in SRP (NUREG-1800), no exceptions are noted.	Section 2.1.4 Section 2.1.5

APPROACH TO LICENSE RENEWAL TOPICS

Topic	Approach	LRA Section(s)
License Renewal Boundary Drawings and Conventions [2]	License Renewal Boundary Drawings identify at a summary level those mechanical, electrical, and structural components in-scope for License Renewal. Standard drawing conventions are used. Components in-scope for License Renewal are consistently highlighted with those in-scope for 10 CFR 54.4(a)(2) separately identified.	Section 2.1.4.4 Drawing Legend, LR-36032
Fuse Holders [3.1]	Fuse holders were addressed consistent with ISG-05.	Section 2.1.4.3 Table 3.6.2-2
Neutron and Radiation Monitoring Cables [3.2]	Instrument cables which may experience a reduction in insulation resistance (IR) due to prolonged exposure to elevated temperatures or high radiation are in-scope for License Renewal.	Section 2.5.2.3 Table 3.6.2-3 Appendix B2.1.16
Steam Dryer [3.3]	The reactor vessel steam dryer is in-scope for License Renewal. Aging management of the dryer is addressed by the Plant Chemistry Program, the BWR Vessel Internals Program for SCC/IGSCC, and the BWR Vessel Internals Program for cyclic loading.	Section 2.3.1.3 Table 3.1.2-3 Appendix B.2.1.12 Appendix B.2.1.25
Refueling Seals [3.4]	The reactor pressure vessel to drywell refueling seal, drywell to reactor building refueling seal, and spent fuel pool gate seals are all in-scope for License Renewal.	Section 2.4.13 Table 2.4.13-1 Table 3.5.2-13 Section 2.4.15 Table 2.4.15-1 Table 3.5.2-15
Crane Rail Supports, Cranes, Rails, Hoists, and Other Lifting Devices [3.5 thru 3.9]	Cranes, other lifting devices, including bridge, trolleys, and rail systems used in the Reactor and Turbine Buildings are in-scope for License Renewal in accordance with 10 CFR 54.4(a)(2). No hoists are in-scope for License Renewal.	Section 2.4.1 Table 3.5.2-1
Offsite Power System Components, Station Blackout (SBO) Recovery [3.10]	Equipment relied upon for SBO recovery is in-scope for License Renewal consistent with ISG-02. Plant specific recovery paths have been identified.	Section 2.1.4.3 Section 2.5.2.4
Spent Fuel Pool System Piping and Makeup Water [3.11]	The spent fuel pool system piping and makeup water source piping inside the Reactor Building are in-scope for License Renewal in accordance with 10 CFR 54.4(a)(2) (non safety affecting safety).	Section 2.3.3.10 Section 2.3.4.1

Topic	Approach	LRA Section(s)
Housings for Active Components [3.12]	Consistent with Interim Staff Guidance on housings for active components, fan and damper housings with intended functions meeting the criteria of 10 CFR 54.4(a) are in-scope for License Renewal and subject to aging management review (AMR).	Section 2.1.4.3.2
10 CFR 54.4(a)(2) Non-Safety Related SSC Evaluation Methodology [4.1]	Non safety related SSCs were identified based on their impact to 10 CFR 54.4(a)(1) SSCs in accordance with 10 CFR 54.4(a)(2), Interim Staff Guidance on Scoping Criterion 10 CFR 54.4(a)(2), NUREG-1800 and appropriate guidance from NEI 95-10 as described in the LRA.	Section 2.1.4.2.2 Section 2.1.4.3.2
10 CFR 54.4(a)(2) Preventive and/or Mitigative Approach [4.2]	Non-safety related SSCs credited in the CLB for preventive or mitigative functions in support of 10 CFR 54.4(a)(1) functions were included in-scope for License Renewal.	Section 2.1.4.2.2
10 CFR 54.4(a)(2) Scoping of Non-Safety Related SSCs [4.3]	SSCs meeting 10 CFR 54.4(a)(2) included three categories: (1) those included in the CLB, such as prevention or mitigation of: internal or external floods, high energy line breaks (HELB), missile hazards, and seismic impacts; (2) those directly connected to 10 CFR 54.4(a)(1) systems (typically piping systems); and (3) those whose failure due to spatial proximity could prevent accomplishment of a 10 CFR 54.4(a)(1) function (spatial proximity assumed no credit for break type or spray/exposure duration).	Section 2.1.4.2.2

Topic	Approach	LRA Section(s)
10 CFR 54.4(a)(2) Equivalent Anchors [4.4]	For non-safety related SSCs directly connected to 10 CFR 54.4(a)(1) SSCs, the in-scope boundary for license renewal extends into the non-safety related (NSR) portion of the piping and supports up to and including the first equivalent anchor (as defined in the LRA) beyond the NSR/10 CFR 54.4(a)(1) interface. 10 CFR 54.4(a)(2) boundaries are clearly delineated on the License Renewal drawings. 10 CFR 54.4(a)(2) SSCs are managed by the appropriate Aging Management Program, typically the System Condition Monitoring, Structures Monitoring, Plant Chemistry, and/or One Time Inspection Programs. Components, assets, and commodities meeting Scoping Criterion 2 were identified in the same unique manner as all other SSCs in-scope for License Renewal (e.g., valves, pumps, piping, etc.).	Section 2.1.4.2.2
Thermal Insulation In-Scope for License Renewal [5]	Thermal insulation on the piping in the High Pressure Coolant Injection room and the heat exchangers in the Residual Heat Removal rooms has been credited in room heat-up calculations and is in-scope for License Renewal. No other thermal insulation performs an intended function.	Table 3.2.2-4 Table 3.2.2-7
Consumables [6]	Evaluation of items to determine whether or not they are consumables followed the guidance contained in Table 2.1-3 of NUREG-1800.	Section 2.1.5.3
Structures not In-Scope for License Renewal [7]	Structures, buildings, and houses within the site boundary that perform no intended function are listed in the LRA and depicted on the site map License Renewal boundary drawing. Seismic II/I was considered.	Table 2.2-1 LR-36444
Component Assignment to License Renewal Systems [8]	Some system groupings and a very limited number of component realignments were performed to support scoping activities and GALL comparisons as described in the LRA. Components and commodities are uniquely identified and tracked to these LR systems.	Section 2.1.4.1 Table 2.2-1

Topic	Approach	LRA Section(s)
Aging Management Reviews (AMRs):		
Intergranular Stress Corrosion Cracking (IGSCC) and Stress Corrosion Cracking (SCC) [9]	IGSCC/SCC were identified as applicable aging mechanisms for mechanical systems. The Monticello BWR Stress Corrosion Cracking and Plant Chemistry Program manages cracking for pipe ≥4" with reactor coolant greater than 200F. For pipe <4" with reactor coolant greater than 140F, IGSCC/SCC is managed by ASME Section XI Program, One Time Inspection Program and Plant Chemistry. For all other components with treated water greater than 140F cracking is managed predominantly by the One Time Inspection Program and Plant Chemistry Program.	Section 3.1 Table 3.1.1, Item 3.1.1-29 Section 3.2 Table 3.2.1, Item 3.2.1-16 Section 3.3 Table 3.3.1, Item 3.3.1-27 Section 3.4 Appendix B2.1.10 Note 108, 208, 308, 408
Steam Generator Feedwater Inlet Ring Assemblies [10]	Not part of the Monticello design (PWRs only).	None
Ground Conductors [11.1]	Un-insulated ground conductors are not in-scope for License Renewal. They perform no intended function.	Section 2.5.2.3
Transmission Conductors [11.2]	No aging effects requiring management for the period of extended operation were identified for Transmission Conductors or High Voltage Insulators.	Section 2.5.2.4 Table 3.6.2-4
Flow-Accelerated Corrosion (FAC) Program [12]	Consistent with the GALL, the aging effect loss of material due to flow-accelerated corrosion is managed by the FAC Program.	Table 3.1.2-1 Table 3.1.2-4 Table 3.2.2-4 Table 3.2.2-6 Table 3.3.2-2 Table 3.3.2-15 Table 3.4.2-2 Table 3.4.2-4 Table 3.4.2-5 Appendix B2.1.19
Reactor Vessel Flange Leak Detection Piping [13]	The reactor vessel flange leak detection piping is in-scope for License Renewal. The aging mechanism of SCC for this piping is managed by the Plant Chemistry Program and One Time Inspection Program.	Section 2.3.1.5 Table 3.1.2-5

Topic	Approach	LRA Section(s)
Primary containment Bellows, Moisture Barriers, Seals, and Gaskets [14]	The drywell-to-suppression chamber vent line bellows and primary containment process penetration bellows are in-scope for License Renewal and required a TLAA evaluation for fatigue. Primary containment moisture barriers, seals, and gaskets are in-scope for License Renewal and managed by the Primary Containment In-Service Inspection Program and the 10 CFR 50, Appendix J Program.	Section 4.6.4 Section 4.6.5 Section 2.4.13 Table 2.4.13-1 Table 3.5.2-13
Galvanic Corrosion and Leaching Aging Mechanisms [15]	Galvanic corrosion and selective leaching are included as aging mechanisms requiring management consistent with the GALL. AMPs are assigned to manage these AERMs.	For galvanic corrosion: 3.2.1-y Tables 3.2.2-y Tables 3.3.2-y Tables 3.4.2-y Tables For selective leaching: 3.2.2-y Tables 3.3.2-y Tables 3.4.2-y Tables
Aging Management of Structural Components [16.1]	The Structures Monitoring Program manages aging effects for structural components and not piping/fittings. For example, piping embedded in concrete or encased in guard pipes in-scope for License Renewal are managed as follows: - Wells and Domestic Water System concrete embedded valves and pipe: One Time Inspection Program - Radwaste Solid and Liquid System concrete embedded pipe: One Time Inspection Program - Portion of the fuel oil transfer pipe passing through the Access Tunnel encased in a fire protection guard pipe: Fuel Oil Chemistry and One Time Inspection Programs. The guard pipe (fire barrier) is covered in the Fire Protection Program. - Drywell penetrations, including those with a guard pipe between the hot process line and penetration nozzle: 10 CFR 50 Appendix J Program.	Appendix B2.1.31 Table 3.3.2-18 Table 3.3.2-13 Section 2.3.3.6, Table 3.3.2-6, and Table 3.5.2-5 Section 2.4.13.d and Table 3.5.2-13

Topic	Approach	LRA Section(s)
Aging Management of Thermal Sleeves [16.2]	Thermal sleeves are included in the Reactor Pressure Vessel Internals and Reactor Pressure Vessel Systems. Aging effects are not managed by the Structures Monitoring Program or the Primary Containment In-Service Inspection Program. AMPs include Chemistry Program, BWR Vessel Internals Program, BWR Feedwater Nozzle Program, and BWR Stress Corrosion Cracking Program.	Table 3.1.2-2 Table 3.1.2-3
External and Internal Aging Effects Management [17.1 & 46.2]	Both external and internal aging effects and environments, consistent with the GALL, are identified in the LRA. Aging effects requiring management were assigned to the aging management program(s) most effective for mitigation and/or inspection of the aging effect. For example, System Condition Monitoring is only relied upon for external aging effects as it performs periodic external visual inspections. Other programs are used to manage internal aging effects such as the One Time Inspection Program.	Appendix B2.1.23 Appendix B2.1.32
Preventive Maintenance AMP [17.2]	A plant specific AMP for preventive maintenance is not included in the LRA. Individual preventive maintenance tasks relied upon for AMP implementation are included as part of the respective AMP.	None
Boric Acid Corrosion AMP [17.3]	Not applicable to Monticello (PWRs only).	None
Further Evaluation Recommended Column in the Aging Management Evaluations Summary Tables [18]	The Further Evaluation Recommended column concludes "Yes" or "No". Where "Yes" is stated, a reference to the appropriate LRA section where additional evaluation details can be found is included. Where "No" is stated, additional details and bases can be found in the Discussion column.	Table 3.1.1 Table 3.2.1 Table 3.3.1 Table 3.4.1 Table 3.5.1 Table 3.6.1
Aging Management Programs:		
Ten Program Elements [19]	The ten elements recommended in Appendix A of the GALL for demonstrating AMP effectiveness have been addressed for all LRA AMPs including the plant specific programs.	Appendix B1.1 Appendix B2.1 Appendix B3

Topic	Approach	LRA Section(s)
New Aging Management Programs [20]	Six new aging management programs will be developed and implemented, consistent with the GALL, to manage specific aging effects during the period of extended operation, they are: - Bus Duct Inspection, - Electrical Cables & Connections Not Subject to 10 CFR 50.49, Environmental Qualification Requirements, - Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits, - Inaccessible Medium Voltage (2kV to 34.5kV) Cables Not Subject to 10 CFR 50.49 EQ Requirements, - One Time Inspection, and - Selective Leaching of Materials.	B2.1.6 B2.1.15 B2.1.16 B2.1.21 B2.1.23 B2.1.30
Flux Detector Thimble Tube AMP [21]	Not part of the Monticello design (PWRs only).	None
USAR Supplement and AMP Consistency [22]	The Updated Safety Analysis Report (USAR) supplement for each AMP is identical to the AMP description contained in the LRA and provides sufficient detail as required by SRP Section 3.1.2.4.	Appendix A2.1 Appendix B2.1
GALL and Monticello AMP Comparison [23]	A comparison of Monticello AMPs to GALL recommended AMPs is included in the LRA. A basis is provided for each GALL AMP that was not adopted.	Appendix B2
BWRVIP Guidelines [24]	Applicable guidelines issued by the BWR Vessel Inspection Project (BWRVIP) have been used in various aging management programs to establish inspection and evaluation activities. Adopted guidelines are compared to those recommended by the GALL throughout the AMP descriptions.	Appendix B2.1
BWRVIP Applicant Action Items [25]	BWRVIP Applicant Action Items applicable to Monticello have been addressed as described in the LRA.	Appendix B1.6

APPROACH TO LICENSE RENEWAL TOPICS

Topic	Approach	LRA Section(s)
In-Service Inspection (ISI) Relief Requests [26]	The scope of ASME Section XI Aging Management Programs is defined, per 10 CFR 50.55(a). The LRA does not reference code cases and relief requests (except for a discussion on risk informed ISI). The LRA also states these code cases and relief requests are not exceptions to GALL.	Appendix B2.1.2 Appendix B2.1.26 Appendix B2.1.28
Buried Piping and Tank Inspections [27]	The Buried Piping & Tanks Inspection Program requires buried piping, tanks, and conduit inspections to be inspected when uncovered. Additionally, the program requires these inspections be performed every ten years.	Appendix B2.1.5
Selective Leaching [28]	Hardness testing will be performed in addition to visual inspection, where practical, to detect the presence of selective leaching. Other enhanced inspection techniques are used where hardness testing is not practical.	Appendix B2.1.30
One-Time Inspection Program [29]	The One Time Inspection Program is a new plant program, consistent without exception, to the recommendations of NUREG-1801 Chapter XI, Program XI.M32. The use of the One Time Inspection Program in the AMR tables was applied consistently with GALL.	3.2.1-y Tables 3.2.2-y Tables 3.3.2-y Tables 3.4.2-y Tables
Inspection Methods of the One-Time Inspection Program [30]	Components selected for inspection are those most susceptible to aging effects based on time in service, materials, operating conditions, environment, and operating experience consistent with the recommendations of NUREG-1801 Chapter XI, Program XI.M32. ASME Section XI inspection techniques are used such as volumetric testing.	Appendix B2.1.23
Augmented Inspection of Steam Generator Shell Assemblies [31]	Not part of the Monticello design (PWRs only).	None
Small Bore Piping [32]	Small bore piping, not covered by ASME Section XI aging management programs, is included in the One Time Inspection Program, which uses ASME Section XI inspection techniques such as volumetric testing.	Appendix B2.1.23

Topic	Approach	LRA Section(s)
Cast Austenitic Stainless Steel (CASS) Components Subject to Loss of Fracture Toughness [33]	Examinations are performed on CASS components inside the reactor pressure vessel as part of the Thermal Aging & Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program. Examination techniques include ultrasonic volumetric (UT), surface, and visual. Consistent with the GALL, examination requirements are based on ASME Section XI as enhanced by applicable BWRVIP guidelines.	Appendix B2.1.33
AMP Inspection Frequencies [34 and 35]	Consistent with the GALL, specific AMP inspection frequencies are included in the LRA (e.g., buried tank and pipe inspections every 10 years) or noted by reference to the applicable standards and guidelines used to establish inspection frequencies (e.g., ASME Section XI and BWRVIP guidelines). No exceptions to GALL inspection frequencies are noted in the LRA.	Appendix B2.1
Reactor Vessel Surveillance Program [36]	The Reactor Vessel Surveillance Program is an existing program that will be enhanced to be consistent with the GALL. Monticello is part of the BWRVIP Integrated Surveillance Program (ISP) for monitoring reactor vessel loss of fracture toughness. Monticello intends to follow the guidelines of BWRVIP-116, which is currently under review by the NRC.	Appendix B2.1.29
BWR Vessel Internals Aging Management Program [37]	The BWR Vessel Internals Program will be enhanced, with an exception, to the recommendations of the GALL. The one exception is a later version of the BWR Chemistry Guidelines (BWRVIP-130) has been adopted by Monticello.	Appendix B2.1.12
Time-Limited Aging Analyses (TLAA):		
Evaluation of TLAAs [38.1 thru 38.4]	TLAAs evaluated by Monticello were identified by reviewing the CLB, NUREG-1800, the GALL, BWR Owners Group Technical Reports, NEI 95-10, and other utility LRA submittals. Results are summarized in the LRA and applicable TLAAs are described in detail, including a summary of the analysis, acceptance criteria, and results.	Table 4.1-1 Section 4.0

Topic	Approach	LRA Section(s)
Neutron Embrittlement of the Reactor Pressure Vessel [39]	The impact of extended operation (54 "effective full power years" EFPY) on Upper Shelf Energy (USE) and Adjusted Reference Temperature (ART) was determined. Material data includes both Monticello specific data and industry material test results.	Section 4.2.1 Table 4.2.1-1 Section 4.2.2 Table 4.2.2-1 Table 4.2.2-2
Reactor Pressure Vessel P-T Limits [40]	The calculations associated with the reactor pressure vessel Pressure-Temperature limits are a TLAA and have been evaluated for the effects of extended operation. The Adjusted Reference Temperature (ART) remains essentially unchanged.	Section 4.2.5
Plant Unique TLAAs [41 & 41.1]	Results of the TLAA review are summarized in the LRA. Plant unique TLAAs identified from the CLB review include the RCIC and HPCI turbine exhaust penetration fatigue analysis and Reactor Building Crane load cycles analysis.	Table 4.1-1
Fatigue Monitoring Program [42.1 thru 42.4]	Calculated Cumulative Usage Factors (CUF) remain < 1.0 with reactor coolant environment effects included for all locations specified in NUREG/CR-6260 for older vintage BWRs. Plant transients, projected to the end of extended operation, were used in the fatigue analysis. The list is included in the LRA. Periodic updates are performed, as part of the Metal Fatigue of the Reactor Coolant Pressure Boundary Program, to confirm projections remain conservative and to manage the CUF. The program is not used to manage other aging effects, such as cracking.	Section 4.3.1 Section 4.5 Appendix A3.2 Appendix A3.7 Appendix B3.2 Table A3.7-1
Pump Flywheel TLAA [43]	Not applicable TLAA at Monticello.	None
Concrete Containment Tendon Prestress [44]	Not applicable TLAA at Monticello.	Table 4.1-1
General:		
Environmental Report [45]	The LRA includes an Environmental Report as required by 10 CFR 51.53(c).	Appendix E

Topic	Approach	LRA Section(s)
Scope of Aging Management Programs [46.1 & 3]	The scope of AMPs was appropriately defined consistent with the GALL and with the types of inspections and control activities included in each AMP. For example, the Flow-Accelerated Corrosion (FAC) Program manages loss of material due to flow accelerated corrosion but does not manage cracking. The program is based on appropriate industry guidelines and predictive tools for selecting inspection locations. See response to Item 17 for further details.	Appendix B2.1.
AMR Materials [46.4 & 47.1 thru 47.3]	Material types were identified based on equipment design and procurement specifications, drawings, vendor technical manuals, piping specifications, and select walk downs. Material types are identified in the Aging Management Review tables to a comparable level of detail as the existing and draft revision of GALL. There is no cast iron in the Reactor Coolant System.	Section 3.0.8.2 3.1.2-y Tables 3.2.2-y Tables 3.3.2-y Tables 3.4.2-y Tables 3.5.2-y Tables 3.6.2-y Tables
Steam Generator Integrity and Boric Acid Corrosion AMPs [46.5 & 46.6]	Not applicable to Monticello (PWRs only).	None
Component Types [48.1 thru 48.4]	Component types evaluated on a system and structure basis are itemized in the LRA. Component types are consistent with the breakdown and level of detail included in the existing and draft revision of GALL.	3.1.2-y Tables 3.2.2-y Tables 3.3.2-y Tables 3.4.2-y Tables 3.5.2-y Tables 3.6.2-y Tables
License Commitments [49]	License commitments were included in an itemized list attached to the LRA transmittal letter.	Cover Letter
Intended Functions [50]	Intended functions applied at the component level are itemized in the LRA. Functions were established at sufficient detail to correlate the component to the associated system or structure function(s), confirm in-scope applicability relative to 10 CFR 54.4(a), and provide sufficient detail to support identification of aging effects requiring management.	Table 2.1-1