



NUCLEAR ENERGY INSTITUTE

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Mr. Christopher I. Grimes
Chief, License Renewal and Standardization Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: Generic Aging Lessons Learned Report Comments

PROJECT NUMBER: 690

Dear Mr. Grimes:

Enclosed are comments on Generic Aging Lessons Learned (GALL) Report Chapter III, Section B. The enclosure includes three documents. One document is a mark-up of the existing GALL pages to reflect our comments. Each comment is identified by number. The second document is a table containing our comments, numbered consistent with the marked-up pages. The third document is a clean copy of the GALL pages to reflect how GALL reads with our comments incorporated.

Please note that in previous comments we suggested creating a new Chapter XI in GALL as a repository for the program evaluations. Having such a chapter allows the various GALL sections to merely reference the new chapter when a program is credited. In the enclosed comments we have followed this recommendation by providing write-ups for the Maintenance Rule, Boric Acid Corrosion, and ASME Section XI, Subsection IWF.

Also in our previous comments we recommended removing Time Limited Aging Analyses (TLAA) from GALL and moving them to the License Renewal Standard Review Plan. As a minimum, we recommend the creation of a new chapter in GALL as a repository for TLAA's. The TLAA's in section IIIB are identified but have not moved to a new chapter pending a decision by the NRC staff relative to our recommendation.

We look forward to discussing the enclosed comments with the NRC staff. Please contact me to establish a meeting date.

Sincerely,

Douglas J. Walters

Enclosures

c: Mr. Sam Lee
Mr. P.T. Kuo

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Boric Acid Corrosion Aging Management Program

DESCRIPTION

Generic Letter 88-05 "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants," March 17, 1988 mandates that PWR licensees monitor the condition of the reactor coolant pressure boundary for occurrences of borated water leakage. Periodic Visual Inspection of adjacent structures, components and supports for evidence of leakage and corrosion should be an element of the applicant's 88-05 monitoring program.

EVALUATION AND TECHNICAL BASIS

- 1) **Scope of Program:** This AMA encompasses leakage from mechanical closures in the RCS and other safety-related borated water systems. The Program utilizes systematic inspections, leakage evaluations, and corrective actions to ensure that boric acid corrosion does not lead to degradation of the leakage source or adjacent structures or components which could cause loss of the SC intended function.
- 2) **Preventive Actions:** The removal of concentrated boric acid and elimination of boric acid leakage mitigates corrosion by minimizing the exposure of the susceptible material to the corrosive element.
- 3) **Parameters Monitored or Inspected:** Boric acid residue, borated water leakage, and degradation of coatings are directly related to the degradation of components. The AMA monitors the effects of boric acid corrosion and/or aggressive chemical attack on the intended function of the component by detection of coolant leakage by implementing the requirements delineated in GL 88-05 including guidelines for locating small leaks, conducting examinations, and performing engineering evaluations.
- 4) **Detection of Aging Effects:** Degradation of the component due to boric acid corrosion or aggressive chemical attack cannot occur without leakage of coolant containing boric acid. Conditions leading to boric acid corrosion such as crystal buildup and evidence of moisture are readily detectable by visual inspections. Insulation need be removed from areas only when leakage is observed or suspected, or when a leakage path must be exposed for additional inspection. Inspection criteria are included in the plant-specific procedures.
- 5) **Monitoring and Trending:** Information obtained from the performance of inspections and evaluations under this activity can be added to the previously existing data. This information is available for review for trending purposes. However, there are no monitoring or trending activities required by GL 88-05, and none are necessary to manage this Aging Effect/Mechanism.
- 6) **Acceptance Criteria:** All identified cases of boric acid leakage and/or crystal buildup are evaluated.
- 7) **Corrective Actions:** GL 88-05 requires that corrective actions to prevent recurrences of degradation caused by boric acid leakage be included in the program implementation. These corrective actions include any modifications to be introduced in the present design or operating procedures of the plant that (a) reduce the probability of primary coolant leaks at the locations where they may cause corrosion damage and (b) entail the use of suitable corrosion resistant materials or the application of protective coatings/claddings.
- 8)
- 9) **Confirmation Process and Administrative Controls:** Site QA procedures, review and approval processes, and administrative controls are implemented in accordance with the requirements of Appendix B to 10 CFR Part 50 and will continue to be adequate for the period of extended operation. Subsequent walkdowns prior to plant start-up confirm that corrective actions were taken and are effective.
- 10) **Operating Experience:** Inspection points should be added as deemed necessary based on operating experience. The responsible personnel should review industry-operating experience to explore methods aimed at reducing boric acid related corrosion. The inspection measures required by GL 88-05 are deemed adequate for managing boric acid corrosion by NUREG-1705.

XI. Existing AGING MANAGEMENT PROGRAMS AND ACTIVITIES

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Maintenance Rule – 10 CFR 50.65

DESCRIPTION

The "Maintenance Rule" is intended to monitor the effectiveness of maintenance activities in nuclear power plants. It focuses on the adequacy of preventive and corrective maintenance activities.

10CFR50.65 requires each licensee to develop and implement a program to verify that the current licensing basis (CLB) is maintained through periodic structures, systems, and components. The nuclear power industry, through the developed guidance for the development of such programs. Rev.2 to NUMARC 93-01 was issued in April 1996. USNRC Regulatory Guide 1.160, Rev. 2, issued in March 1997, identifies this document as an acceptable approach to meeting the objectives of 10CFR50.65.

Revision 2 to NUMARC 93-01 added Section 10.2.3, "Monitoring the Condition of Structure." It emphasizes the importance of monitoring the condition of plant structures. Quoting from this report, "Monitoring the condition of structures, like systems and components, should be predictive in nature and provide early warning of degradation. The baseline condition of plant structures should be established to facilitate condition monitoring activities."

Regulatory Position 1.5 "Monitoring of Structures" in RG1.160, Rev 2, states that the Maintenance Rule does not treat components differently from systems and components.. The attributes of an acceptable structure-monitoring program are discussed.

Structures Monitoring Programs developed to meet the requirements of 10CFR50.65 (Maintenance Rule) can be credited for addressing aging management of structures and structural components to meet the requirements of 10CFR54 (License Renewal). License Renewal applications are encouraged to take credit for existing programs.

A well formulated and documented structures monitoring program, in accordance with the guidance provided in NUMARC 93-01, Revision 2; and Regulatory Guide 1.160, Revision 2, should satisfy the requirements for an acceptable aging management program for License Renewal, when evaluated against the ten (10) criteria defined in Section 3.0 of the Draft SRP for License Renewal

The Calvert Cliffs and Oconee License Renewal applications do not directly take credit for structure monitoring under The Maintenance Rule. Plant-specific structure monitoring programs are identified and described, to demonstrate that adequate aging management programs are in place for structure and structural components. These programs were evaluated by the staff against the ten- (10) criteria for an acceptable aging management program, defined in Section 3.0 of Draft SRP-LR. For the most part, these programs are considered Adequate. Specific open and confirmatory items are identified where these programs fall short of completely satisfying the ten criteria. Prospective applicants for License Renewal may review the Calvert Cliffs and Oconee applications/SERs, for examples of structures monitoring programs which were credited for License Renewal.

"NUREG-1705 includes five pages of specific discussion of the Calvert Cliffs Structure and System Walkdowns in the Program section. This procedure evolved from a good practice to incorporate the requirements of the Maintenance Rule.

The NRC Staff credits this procedure as an aging management program for each structure, for component supports, and for numerous systems."

EVALUATION AND TECHNICAL BASIS

An applicant for License Renewal may reference its Structures Monitoring Program developed to meet the requirements of the Maintenance Rule (10CFR50.65), as further defined and clarified by NUMARC 93-01, Revision 2 and Regulatory Guide 1.160, Revision 2. The guidelines contained in these documents provide

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XI. Existing AGING MANAGEMENT PROGRAMS AND ACTIVITIES
Maintenance Rule

an adequate foundation for formulating licensee-specific MR Structures Monitoring Programs. An applicant for License Renewal should confirm that its MR Structures Monitoring Program adequately manages the effects of aging so that the intended functions of structures will be maintained, consistent with the current licensing basis, for the period of extended operation. The applicant should assess its MR Structures Monitoring Program against the attributes of an acceptable aging management program. Evaluation of MR Structures Monitoring against the ten (10) attributes for any acceptable aging management program follows:

- 1) Scope of Program:** The MR Structures Monitoring Program scope is defined by the licensee; it may or may not encompass all structures and structural components, which must be reviewed for License Renewal. The applicant should clearly identify the structure/aging effect combinations, which are managed by the MR Structures Monitoring Program.
- 2) Preventive Actions:** No preventive actions are specified and the staff has found this acceptable.
- 3) Parameters Monitored/Inspected:** For MR Structures Monitoring Programs, specification of the parameters monitored or inspected should be linked to aging effects that could cause a loss of intended function. The applicant should confirm that its specification of parameters to be monitored or inspected is consistent with meeting attribute 3.
- 4) Detection of Aging Effects:** Detection of aging effects before there is loss of intended function requires that periodic inspection be conducted, utilizing appropriate inspection methods implemented by qualified inspectors. Under the Maintenance Rule, the individual licensees define the inspection schedule, inspection methods and inspector qualifications. An applicant for License Renewal should confirm that these elements of its MR Structures Monitoring Program are consistent with meeting attribute 4.
- 5) Monitoring and Trending:** No monitoring and trending processes are specified and based on the evaluation of the other attributes the need for such monitoring and trending is not necessary.
- 6) Acceptance Criteria:** Classification of deficiencies against which the need for corrective action is evaluated, are not specified in the MR or its implementing documents. These criteria are defined on a licensee specific basis. The classification of deficiencies should be consistent with existing applicable codes and standards and/or good engineering practice. The applicant for License Renewal should confirm that the classification of deficiencies utilized in its timely corrective action prior to loss of intended function and are consistent with meeting Criterion 6.
- 7) Corrective Actions:** Provided the MR Structures Monitoring Program is conducted under 10 CFR 50, Appendix B (Quality Assurance), attribute 7 "Corrective Action" is satisfied.
- 8) Confirmation Process:** Provided the MR Structures Monitoring Program is conducted under 10 CFR 50, Appendix B (Quality Assurance), attribute "Confirmation" is satisfied.
- 9) Administrative Controls:** Provided the MR Structures Monitoring Program is conducted under 10 CFR 50 Appendix B (Quality Assurance), attribute 9 "Administrative Controls" is satisfied.
- 10) Operating Experience:** MR Structures Monitoring Programs to detect and correct aging degradation, which threatens intended functions, have only recently been implemented.

XI. Existing Aging Management Programs And Activities

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ASME Section XI, Subsection IWF

DESCRIPTION

10CFR50.55a imposes the inservice inspection requirements of ASME B&PV Code Section XI on Class 1, 2, and 3 piping and components and their associated supports. Inservice inspection of supports is covered in Subsection IWF. Therefore, ASME Code Section XI, Subsection IWF constitutes an existing mandated program which may be credited for managing aging of supports for license renewal.

EVALUATION AND TECHNICAL BASIS

- 1) **Scope of Program:** For Class I piping and component supports, IWF (1989 Edition) refers to IWB for inspection scope and schedule. It can be inferred from Table IWB-2500-1, Examination Category B-J "Pressure Retaining Welds in Piping," Note (1)(d) that only 25% of non-exempted supports are subject to examination. The same supports are inspected in each 10-year inspection interval. For Class 2 and 3 MC piping and component supports, IWF (1989 Edition) refers to IWC, IWD, and IWE for the inspection scope and schedule. It can be inferred from Table IWC-2500-1, Examination Categories C-F-1 and C-F-2 that only 7.5% of non-exempted supports are subject to examination for Class 2 systems. The same supports are inspected in each 10 year inspection interval. No specific numerical percentages are inferred in IWD and IWE for Class 3 and Class MC respectively
- 2) **Preventative Action:** No preventive actions are specified; IWF is a monitoring program.
- 3) **Parameters Monitored/Inspected:** As part of the visual examination (VT-3), general corrosion which is an indication of loss of material is noted during the inspection. Although cracking is not explicitly noted in IWF, the visual inspection (VT-3) would be expected to identify cracks. Also, Table IWF-2500-1 specifies examination of the following: (F1.10) Mechanical connections to pressure retaining components and building structure; (F1.20) Weld connections to building structure; (F1.30) Weld and mechanical connections at intermediate joints in multi-connected integral and non-integral supports; (F1.40) Clearances of guides and stops, alignment of supports, assembly of support items; (F1.50) Spring supports and constant load supports; (F1.60) Sliding Surfaces; (F1.70) Hot or cold position of spring supports and constant load supports.
- 4) **Detection:** A VT-3 visual examination is specified in Table IWF-2500-1. The qualified VT-3 inspector uses judgement in assessing general corrosion; it is not documented unless loss of structural capacity is suspected. Visual inspection would also detect surface cracks, at a mature stage of crack growth.
- 5) **Monitoring and Trending:** There is no requirement to monitor or report progressive, time-dependent degradation. Unacceptable conditions, per IWF-3400 are noted for correction or further evaluation. Since the same supports are monitored, each inspection interval, trending is possible, but not required. An observed crack would be immediately identified for corrective action and/or detailed evaluation. Monitoring would be inappropriate.
- 6) **Acceptance Criteria:** The acceptance standards for visual examination that manages cracking and loss of material are specified in IWF-3400. Under (b)(5), "roughness or general corrosion which does not reduce the load bearing capacity of the support" is given as an example of a "nonrelevant condition." Also, IWF-3410 identifies the following conditions as unacceptable: (i) deformations or structural degradations of fasteners, springs, clamps, or other support items; (ii) missing, detached, or loosened support items; (iii) arc strikes, weld spatter, paint, scoring, roughness, or general corrosion on close tolerance machined or sliding surfaces; (iv) improper hot or cold positions of spring supports and constant load supports; (v) misalignment of supports; (vi) improper clearances of guides and stops. Observation of a crack would be identified as an unacceptable condition, which must be addressed immediately.
- 7) **Corrective Actions:** These are delineated in IWF-3122.2. In accordance with IWF-3122, supports containing relevant conditions shall be evaluated and tested, or corrected prior to returning to service. IWF-3122.3 provides an alternative for evaluation/testing to substantiate integrity for intended purpose. Identification of unacceptable conditions triggers an expansion of the inspection scope, per IWF-2430, and re-examination of the supports requiring corrective action during the next inspection period (3 years), per IWF-2420(b).

XI. Existing Aging Management Programs And Activities
ASME Section XI, Subsection IWF

- 8) **Confirmation Process:** Documentation of inspection results, corrective actions and evaluations is required. This would typically be reviewed by the Authorized Nuclear Inspector.
- 9) **Administrative Controls:** The program is conducted under 10CFR50, Appendix B (Quality Assurance); therefore, the Administrative Controls attribute is satisfied.
- 10) **Operating Experience:** To date, IWF sampling inspections appear to be effective in managing aging effects. If sampling is inadequate, it will likely come to light as plants age. Revisions to IWF inspection scope would be expected in this case.

GALL REPORT-CIVIL/STRUCTURAL COMMENTS
Sections B1-B5

Comment Number	GALL Section	ITEM NO.	Page	COMMENT
86	All	Generic		Environmental Corrosion is listed in numerous Aging Mechanism columns. Recommend expanding the term to indicate it includes pitting corrosion and general corrosion.
87	B1	Generic		When there is a reference back to a previous Item Number, recommend the specific text be added in lieu of the reference.
88		Generic		We have an effort underway to extract all TLAAAs from the GALL and relocate them in the SRP.
407	B1	Various	III B1-3 III B1-9	Agree that ASME Section IWF Inspections are adequate for managing aging effects. However, a note should be added to clarify that the code excludes piping and equipment integral attachments.
359	B1	B.1.1.1	III B1-4	Move discussion of ASME Section XI, Subsection IWF to Chapter XI.
85	B1	B1.1.1	III B1-4	Attribute (3) Parameters Monitored: parameters monitored should tie directly to the aging effect that the program is managing. The statement should be changed to read: <i>As part of the visual examination (VT-3), general corrosion which is an indication of loss of material is noted during the inspection.</i>
90	B1	B1.1.1	III B1-4	Attribute (7) Corrective Actions: Add sentence, "In accordance with IWF-3122, supports containing relevant conditions shall be evaluated and tested, or corrected prior to returning to service.
91	B1	B1.1.1	III B1-4	Attribute (9) Administrative Controls: delete text and add the following: <i>The program is conducted under 10 CFR 50 Appendix B (Quality Assurance); therefore, the Administrative Controls attribute is satisfied.</i>
360	B1	B1.1.1	III B1-5	Change Crack initiation and growth to Cracking.
92	B1	B1.1.1 B.2.1	III B1-6 III B2-6	Boric Acid Corrosion program attribute (2) Preventative Actions: the text should be changed as follows: <i>The removal of concentrated boric acid and elimination of boric acid leakage mitigates corrosion by minimizing the exposure of the susceptible material to the corrosive element.</i> BASIS: Parts of the Boric Acid Corrosion Program are preventative in nature.
93	B1	B1.1.1	III B1-6	Boric Acid Corrosion program attribute (3) Parameters Monitored/Inspected: The text should be changed as follows: <i>Boric acid residue, borated water leakage, and degradation of coatings are directly related to the degradation of components. The AMA monitors the effects of boric acid corrosion and/or aggressive chemical attack on the intended function of the component by detection of coolant leakage by implementing the requirements delineated in GL 88-05 including guidelines for locating small leaks, conducting</i>

GALL REPORT-CIVIL/STRUCTURAL COMMENTS
Sections B1-B5

				<i>examinations, and performing engineering evaluations.</i> BASIS: Developing procedures does not identify the parameters monitored or inspected.
94	B1	B1.1.1	III B1-6	Boric Acid Corrosion program attribute (6) Acceptance Criteria: The text should be changed as follows: <i>All identified cases of boric acid leakage and/or crystal buildup are evaluated.</i>
95	B1	B1.1.1	III B1-6	Boric Acid Corrosion program attribute (8) Confirmation Process: The text should be changed as follows: <i>Site QA procedures, review and approval processes, and administrative controls are implemented in accordance with the requirements of Appendix B to 10 CFR Part 50 and will continue to be adequate for the period of extended operation. Subsequent walkdowns prior to plant start-up confirm that corrective actions were taken and are effective.</i> BASIS: This element is dealing with confirmation of the corrective action not on implementation of the program
362	B1	B.1.1	IIIB1-6	Move discussion of Boric Acid Corrosion program to proposed GALL Chapter XI.
96	B1	B1.1.2	III B1-8	The Existing Aging Management Program column for stress corrosion cracking identifies Generic Letter 91-17 as the existing aging management program. Generic Letter 91-17 is not a program. The program should be identified as IWF. BASIS: Generic Letter 91-17 did not require any specific action or written response.
100	B1	B1.1.4	III B1-9	Item B1.1.4. Change the aging mechanism to "vibration"
84	B1	B1.1.4 B2.1	III B1-10 III B2-4	The Existing Aging Management Program column need only identify the Maintenance Rule and the Evaluation and Technical Basis column should reference proposed GALL Chapter XI for an evaluation of the Maintenance Rule.
83	B1	B1.2.2	IIIB1-17	In the Material column what does "other" mean?
110	B2	B1.1.4 B.1.2.3 B.2.2 B.2.3 B3.2 B4.3 B5.2	III B1-19 III B2-7 III B3-7 III B4-7 III B5-7	Item should not be identified as having aging effects requiring programmatic management. BASIS: Loosening of bolts and reduction in anchor capacity due to vibration are not aging effects. Vibration is handled in the design and installation process. For cable tray, HVAC, etc. supports which are expected to be subjected to vibratory loads, proper design has eliminated or compensated for its occurrence. As evidence, no degradation of these supports due to vibratory loads has been identified in industry data.
120	B4	Example	III B4-2	Cranes are addressed in GALL section VIIB1 and VIIB2
130	B4	B4.3	III B4-7	B4.3 should not be identified as aging effect requiring programmatic management. BASIS: Reduction in anchor capacity due to vibration is not an aging effect. Vibration is handled in the design and installation process. For miscellaneous mechanical supports that are expected to be subjected to vibratory loads, proper design has eliminated or compensated for its occurrence. As evidence, no degradation of

GALL REPORT-CIVIL/STRUCTURAL COMMENTS

Sections B1-B5

				these supports due to vibratory loads has been identified in industry data.
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CHAPTER III B

COMPONENT SUPPORTS

Draft December 6, 1999

Major Component Supports

- B1. Supports for ASME Class Piping and Components
- B2. Supports for Cable Trays, Conduit, HVAC Ducts, TubeTrack, Instrument Tubing, Non-ASME Piping and Components
- B3. Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation
- B4. Supports for Miscellaneous Mechanical Equipment (e.g., Cranes, EDG, HVAC System Components)
- B5. Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

B1. Supports for ASME Class Piping and Components

B1.1 Class 1

B1.1.1 Support Members; Anchor Bolts; Welds

B1.1.2 High Strength Bolting for Major NSSS Component Supports

**B1.1.3 Constant/Variable Load Spring Hangers; Guides; Stops; Sliding Surfaces;
Design Clearances**

B1.1.4 Building Concrete Surrounding Anchor Bolts; Grout Pads

B1.2 Class 2, 3 and MC

B1.2.1 Support Members; Anchor Bolts; Welds

**B1.2.2 Constant/Variable Load Spring Hangers; Guides; Stops; Sliding Surfaces;
Design Clearances**

B1.2.3 Building Concrete Surrounding Anchor Bolts; Grout Pads

B1. Supports for ASME Class Piping and Components

Systems, Structures, and Components

Review Table III B1 addresses supports/anchorage for ASME Class piping systems and associated components. B1 is further subdivided into Class 1 (B1.1) and Class 2, 3, and MC (B1.2). Component supports are not specifically addressed in the draft Standard Review Plan for License Renewal (SRP-LR). Regions of interest and applicable aging effects are identified in the Table. The aging management review is presented for each region of interest /aging effect combination.

System Interfaces

Physical interfaces exist with the structure, system or component being supported and with the building structural element to which the support is anchored. The primary functional interface is to ensure adequate anchorage of the supported element during internal/external design basis events, so that the supported element can perform its intended function.

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B1.1.1	Class 1 Piping and component supports Excluding Integral attachments per the Code 402	Support Members; Anchor Bolts; Welds	Carbon Steel	Inside Contain- ment	Loss of Material	Environ- mental Corrosion (i.e. pitting corrosion, general corrosion, etc.) 86	10CFR50.55a ASME Section XI, Subsection IWF, 1989

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>10CFR50.55a imposes the inservice inspection requirements of ASME B&PV Code Section XI on Class 1, 2, and 3 piping and components and their associated supports. Inservice inspection of supports is covered in Subsection IWF. Therefore, ASME Code Section XI, Subsection IWF constitutes an existing mandated program which may be credited for managing aging of supports for license renewal.</p> <p>359</p> <p>See Comments 85, 90 & 91 for proposed changes to attributes (3), (7) and (9) respectively.</p> <p>MOVE TO CHAPTER X1</p> <p>359</p>	<p>(1) Scope of Program: IWF (1989 Edition) refers to IWB for inspection scope and schedule. It can be inferred from Table IWB-2500-1, Examination Category B-J "Pressure Retaining Welds in Piping," Note (1)(d) that only 25% of non-exempted supports are subject to examination. The same supports are inspected in each 10 year inspection interval. (2) Preventative Action: No preventive actions are specified; IWF is a monitoring program. (3) Parameters Monitored/Inspected: As part of the visual examination (VT-3), general corrosion which would reduce the structural capacity of the support is noted. (4) Detection: Only visual examination is performed; the qualified VT-3 inspector uses judgement in assessing general corrosion; it is not documented unless loss of structural capacity is suspected. (5) Monitoring and Trending: There is no requirement to monitor or report progressive, time-dependent degradation. Unacceptable conditions, per IWF-3400 are noted for correction or further evaluation. Since the same supports are monitored, each inspection interval, trending is possible, but not required. (6) Acceptance Criteria: These are provided in IWF-3410. Under (b)(5) "roughness or general corrosion which does not reduce the load bearing capacity of the support" is given as an example of a "nonrelevant condition." (7) Corrective Actions: These are delineated in IWF-3122.2; IWF-3122.3 provides an alternative for evaluation/testing to substantiate integrity for intended purpose. Identification of unacceptable conditions triggers an expansion of the inspection scope, per IWF-2430, and re-examination of the supports requiring corrective action during the next inspection period (3 years), per IWF-2420(b). (8) Confirmation Process: Documentation of inspection results, corrective actions and evaluations is required. This would typically be reviewed by the Authorized Nuclear Inspector. (9) Administrative Controls: An approved site QA Program would be applicable to IWF inspections of supports. (10) Operating Experience: To date, IWF sampling inspections appear to be effective in managing aging effects. If sampling is inadequate, it will likely come to light as plants age. Revisions to IWF inspection scope would be expected in this case.</p> <p>See Chapter X1 for an evaluation of ASME Section XI, Subsection IWF.</p>	<p>No</p>

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Item	Structure/Component	Region of Interest	Material	Environment	Aging Effect	Aging Mechanism	References
B1.1.1	Class 1 Piping and component supports	Support Members; Anchor Bolts; Welds	Carbon Steel	Inside PWR Containment	Loss of Material	Boric Acid Corrosion	NRC GL 88-05 IE Bulletin 82-02 IE IN 80-27 IE IN 86-108 Supplements 1,2, and 3
B1.1.1	Class 1 Piping and component supports	Support Members; Anchor Bolts; Welds	Carbon Steel	Inside Containment	Crack initiation and Growth Cracking 360	Fatigue	10CFR50.55a ASME Section XI, Subsection IWF, 1989 ASME Section III, Subsection NF

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Generic Letter 88-05, Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants, March 17, 1988, mandates that PWR licensees monitor the condition of the reactor coolant pressure boundary for occurrences of borated water leakage. Periodic Visual Inspection of adjacent structures, components and supports for evidence of leakage and corrosion should be an element of the applicant's 88-05 monitoring program.</p>	<p>(1) Scope of Program: The primary coolant pressure boundary of PWR's, containing borated water, must be monitored for early detection of small leaks, in order to prevent significant loss of material from boric acid corrosion. Early detection and correction of leakage should protect adjacent structural elements (e.g., supports) from boric acid corrosion. (2) Preventative Action: This is primarily a monitoring program, in addition to any regular preventive maintenance. (3) Parameters Monitored/Inspected: The required program includes 1) identification of locations where leaks smaller than technical specification limits can cause degradation of the pressure boundary by boric acid corrosion, and 2) development and implementation of procedures for locating small coolant leaks. (4) Detection: The mandated monitoring program includes methods for conducting examinations to detect leakage. Engineering evaluations are then performed to establish the impact on the reactor coolant pressure boundary when leakage is located. (5) Monitoring and Trending: No monitoring or trending activities for assessing the impact of boric acid corrosion on carbon steel reactor pressure boundary components in PWR plants are required by this monitoring program. (6) Acceptance Criteria: No acceptance criteria are specified by NRC monitoring program. Methods must be capable of detecting leaks smaller than technical specification limits. (7) Corrective Action: Corrective actions are taken to prevent recurrence of this type of corrosion. This includes modifications in design and operating procedures as necessary to reduce the probability of primary coolant leaks and the use of suitable corrosion resistant materials or the application of protective coatings/claddings. (8) Confirmation Process: Licenses were required to respond to GL 88-05 within 60 days providing assurances that the mandated program was in place or to be promptly implemented. (9) Administrative Control: The Licensees shall maintain records of the programs and results obtained. (10) Operating Experience: Objective evidence indicates that boric acid corrosion of steel supports and other structural elements is adequately managed by the existing program.</p>	<p>No, provided visual inspection of adjacent areas is included in applicant's program. Otherwise, plant-specific evaluation will be required.</p>
<p>10CFR50.55a imposes the inservice inspection requirements of ASME B&PV Code Section XI on Class 1, 2, and 3 piping and components and their associated supports. Inservice inspection of supports is covered in Subsection IWF. Therefore, ASME Code Section XI, Subsection IWF constitutes an existing mandated program which may be credited for managing aging of supports for license renewal.</p> <p>ASME Section XI, Subsection IWF</p>	<p>(4) Scope of Program and (2) Preventative Action: Same as under "Environmental Corrosion." (3) Parameters Monitored/Inspected: Although cracking is not explicitly noted in IWF, the visual inspection (VT-3) would be expected to identify cracks. (4) Detection: Visual inspection would detect surface cracks, at a mature stage of crack growth, (5) Monitoring and Trending: An observed crack would be immediately identified for corrective action and/or detailed evaluation. Monitoring would be inappropriate. (6) Acceptance Criteria: Observation of a crack would be identified as an unacceptable condition, which must be addressed immediately.</p> <p>See Chapter XI for an evaluation of ASME Section XI, Subsection IWF</p>	<p>No</p>

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MOVE TO CHAPTER XI

See Comments
92, 93, 94 and 95 for changes to attributes (2), (3), (6) and (8) respectively.

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III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B1.1.2	Class 1 Piping and component supports	High strength bolting for major NSSS component supports	Low alloy steel, tensile strength >150 ksi	Inside contain- ment	Crack initiation and growth Cracking G360	Stress corrosion cracking	NRC GL 91-17 EPRI NP-5769 NUREG-1339 IE Bulletin 74-03 IE Bulletin 82-02

III. STRUCTURES AND COMPONENT SUPPORTS
 B1.1 Supports for ASME Class 1 Piping and Components

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Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Some supports may have been designed for a finite number of load cycles, per Section III, Subsection NF, based on a 40 year design life.</p>	<p>(7) Corrective Actions, (8) Confirmation Process, (9) Administrative Controls, (10) Operating Experience: same as under "Environmental Corrosion."</p> <p>Supports designed for a specific number of load cycles will require a TLAA to demonstrate adequacy for the renewal license period.</p>	<p>Yes. Possible TLAA.</p>
<p>Generic Letter 91-17, "Generic Safety Issue 29: Bolting Degradation in Nuclear Power Plants" documents the resolution of GSI-29 and acceptable methods for ensuring bolting reliability, including protection against Stress Corrosion Cracking.</p> <p>ASME Section XI, Subsection IWF</p> <p>See Chapter XI for an evaluation of ASME Section XI, Sub-Section IWF</p>	<p>The resolution of GSI 29 should be sufficient to manage degradation due to SCC. The adequacy of this program as an aging management program is evaluated against the 10 criteria identified in draft SRP LR.</p> <p>(1) Scope of Program: This program identified component support bolting which may be susceptible to SCC and provided recommendations for both generic and plant-specific review procedures to address the issue and implement appropriate corrective measures. (2) Preventive Actions: Monitoring program does not require the use of Preventive actions. However, the program promoted awareness of the material parameters and poor bolting practices that contribute to SCC failure. Video cassette training programs and training manuals addressing good bolting practice evolved and provide a basis to prevent recurrence. (3) Parameters Monitored/Inspected: A screening procedure to review bolting applications was developed. Parameters screened included the minimum yield strength of the bolts, stress level, and assumed size of flaw factors. (4) Detection: A screening program required the identification of susceptible bolting based on pre-service and in-service failure data, material specifications, and bolting stress. Bolting failing to meet the criteria are subject to mechanical tests to verify material strength properties. (5) Monitoring and Trending: No monitoring or trending activities to assess continued bolt integrity is defined in this program. (6) Acceptance Criteria: Probabilistic methods are used to verify fastener pre-load and material parameters for populations of fasteners. Populations are then accepted, rejected, or subject to sample inspection based on screening results. (7) Corrective Action: Populations of fasteners failing to meet screening parameters are dispositioned by retightening/retensioning, mechanical test, fracture and failure analysis, in-service inspection, and replacement. (8) Confirmation Process: No specific confirmation process was required by GL 91-17. (9) Administrative Control: No specific Administrative action was required by GL 91-17. (10) Operating Experience: Lack of continuing problems would indicate that SCC of support bolting is adequately managed by the industry program.</p>	<p>No, provided applicant commits to GL 91-17 to manage this aging effect. Otherwise, plant-specific evaluation is needed.</p>

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ASME Section XI, Subsection IWF

See Chapter XI for an evaluation of ASME Section XI, Sub-Section IWF

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III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Item	Structure/Component	Region of Interest	Material	Environment	Aging Effect	Aging Mechanism	References
B1.1.3	Class 1 Piping and component supports	Constant and variable load spring hangers; guides; stops; sliding surfaces; design clearances; vibration isolators	Steel and other	Inside containment	Loss of mechanical function	Corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads; elastomer hardening	10CFR50.55a ASME Section XI, Subsection IWF, 1989
B1.1.4	Class 1 Piping and component supports Excluding integral attachments per the Code 407	Building concrete surrounding anchor bolts; Grout pads	Reinforced concrete and grout	Inside containment	Reduction in concrete anchor capacity	Concrete degradation due to vibratory loads or other effects Vibration 100	10CFR50.65 NUMARC 93-01, Revision 2 NRC Regulatory Guide 1.160 (formerly Draft DG-1051)

See Chapter XI for an evaluation of ASME Section XI, Subsection IWF.

III. STRUCTURES AND COMPONENT SUPPORTS
 B1.1 Supports for ASME Class 1 Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>10CFR50.55a imposes the inservice inspection requirements of ASME Code Section XI on Class 1, 2, and 3 piping and components and their associated supports. Inservice inspection of supports is covered in Subsection IWF. Therefore, ASME Code Section XI, Subsection IWF constitutes an existing mandated program which may be credited for managing aging of supports for license renewal.</p>	<p>(1) Scope of Program and (2) Preventative Actions: Same as under "Environmental Corrosion," (3) Parameters Monitored/Inspected: Table IWF-2500-1 specifies examination of the following: (F1.10) Mechanical connections to pressure retaining components and building structure; (F1.20) Weld connections to building structure; (F1.30) Weld and mechanical connections at intermediate joints in multi-connected integral and non-integral supports; (F1.40) Clearances of guides and stops, alignment of supports, assembly of support items; (F1.50) Spring supports and constant load supports; (F1.60) Sliding Surfaces; (F1.70) Hot or cold position of spring supports and constant load supports. (4) Detection: VT-3 visual examination is specified in Table IWF-2500-1. (5) Monitoring and Trending: Same as under "Environmental Corrosion." (6) Acceptance Criteria: These are provided in IWF-3410. The following conditions are unacceptable: (i) deformations or structural degradations of fasteners, springs, clamps, or other support items; (ii) missing, detached, or loosened support items; (iii) arc strikes, weld spatter, paint, scoring, roughness, or general corrosion on close tolerance machined or sliding surfaces; (iv) improper hot or cold positions of spring supports and constant load supports; (v) misalignment of supports; (vi) improper clearances of guides and stops. (7) Corrective Actions, (8) Confirmation Process, (9) Administrative Controls, and (10) Operating Experience: Same as under "Environmental Corrosion."</p>	<p>No</p>
<p>Maintenance Rule (10CFR50.65) -Structures monitoring</p> <p>The "Maintenance Rule" is intended to monitor the effectiveness of maintenance activities in nuclear power plants. It focuses on the adequacy of preventive and corrective maintenance activities.</p> <p>10CFR50.65 requires each licensee to develop and implement a program to verify that the current licensing basis (CLB) is maintained through periodic testing and inspection of critical plant structures, systems, and components. The nuclear power industry, through the Nuclear Energy Institute (NEI), has developed guidance for the development of such programs. Rev. 2 to NUMARC 93-01 was issued in April 1996. USNRC Regulatory Guide 1.160, Rev. 2, issued in March 1997, identifies this document as an acceptable approach to meeting the objectives of 10CFR50.65.</p>	<p>An applicant for License Renewal may reference its Structures Monitoring Program developed to meet the requirements of the Maintenance Rule (10CFR50.65), as further defined and clarified by NUMARC 93-01, Revision 2 and Regulatory Guide 1.160, Revision 2. The guidelines contained in these documents provide an adequate foundation for formulating licensee-specific MR Structures Monitoring Programs. An applicant for License Renewal should confirm that its MR Structures Monitoring Program adequately manages the effects of aging so that the intended functions of structures and component supports will be maintained, consistent with the current licensing basis, for the period of extended operation. The applicant should assess its MR Structures Monitoring Program against the attributes of an acceptable aging management program. Evaluation of MR Structures Monitoring against the ten (10) criteria for an acceptable aging management program follows: (1) Scope of Program: The MR Structures Monitoring Program scope is defined by the licensee; it may or may not encompass all structures and structural components which must be reviewed for License Renewal. The applicant should clearly identify the structure/aging effect/aging mechanism combinations which are managed by the MR Structures Monitoring Program. For potential structure/aging effect/aging mechanism combinations not covered by the MR Structures Monitoring Program, the applicant should justify that it is not significant for the applicant's plant, or identify the applicable aging management program.</p>	<p>No, if within the scope of the applicant's MR Structures Monitoring Program. Otherwise, justification for non-applicability or details of plant-specific program need to be evaluated.</p>

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See Chapter XI for an evaluation of the Maintenance Rule.

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References

All comment #84

III. STRUCTURES AND COMPONENT SUPPORTS
 B1.1 Supports for ASME Class 1 Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Revision 2 to NUMARC 93-01 added Section 10.2.3, "Monitoring the Condition of Structures." It emphasizes the importance of monitoring the condition of plant structures. Quoting from this report, "Monitoring the condition of structures, like systems and components, should be predictive in nature and provide early warning of degradation. The baseline condition of plant structures should be established to facilitate condition monitoring activities."</p> <p>Regulatory Position 1.5 "Monitoring of Structures" in RG1.160, Rev. 2, states that the Maintenance Rule does not treat structures differently from systems and components. The attributes of an acceptable structure monitoring program are discussed.</p> <p>Structures Monitoring Programs developed to meet the requirements of 10CFR50.65 (Maintenance Rule) can be credited for addressing aging management of structures and structural components to meet the requirements of 10CFR54 (License Renewal). License Renewal applicants are encouraged to take credit for existing programs.</p> <p>A well formulated and documented structures monitoring program, in accordance with the guidance provided in NUMARC 93-01, Revision 2; and Regulatory Guide 1.160, Revision 2, should satisfy the requirements for an acceptable aging management program for License Renewal, when evaluated against the ten (10) criteria defined in Section 3.0 of the Draft SRP for License Renewal.</p> <p>The Calvert Cliffs and Oconee License Renewal applications do not directly take credit for structures monitoring under the Maintenance Rule. Plant-specific structures monitoring programs are identified and described, to demonstrate that adequate aging management programs are in place for structures and structural components. These programs were evaluated by the staff against the ten (10) criteria for an acceptable aging management program, defined in Section 3.0 of the Draft SRP-LR. For the most part, these programs are considered</p>	<p>(2) Preventive Actions: Inspection and maintenance of protective coatings which inhibit corrosion of steel structural elements should be included as part of Structures Monitoring. No specific preventive actions are identified for other aging mechanisms.</p> <p>(3) Parameters Monitored/Inspected: For MR Structures Monitoring Programs, specification of the parameters monitored or inspected is the responsibility of the licensee. For License Renewal, the specific parameters monitored or inspected should be linked to degradation of intended function(s) and should detect the presence and extent of aging effects. The inspection scope should include bolt-tightness checks for concrete expansion anchors subjected to vibratory loads. The applicant should confirm that its specification of parameters to be monitored or inspected is consistent with meeting Criterion 3.</p> <p>(4) Detection of Aging Effects: Detection of aging effects before there is loss of intended function requires that periodic inspection be conducted, utilizing appropriate inspection methods implemented by qualified inspectors. Under the Maintenance Rule, the inspection schedule, inspection methods and inspector qualifications are defined by the individual licensees. An applicant for License Renewal should confirm that these elements of its MR Structures Monitoring Program are consistent with meeting Criterion 4.</p> <p>(5) Monitoring and Trending: Documentation and comparison of successive inspection results is needed to perform meaningful trending. An appropriate inspection schedule should be established to provide reasonable assurance that adequate monitoring and trending will be accomplished under the MR Structure Monitoring Program.</p> <p>(6) Acceptance Criteria: Acceptance criteria, against which the need for corrective action is evaluated, are not specified in the MR or its implementing documents. These criteria are defined on a licensee-specific basis. The acceptance criteria should be consistent with existing applicable codes and standards and/or good engineering practice. The applicant for License Renewal should confirm that the acceptance criteria utilized in its MR Structures Monitoring Program will provide for timely corrective action prior to loss of intended function and are consistent with meeting Criterion 6.</p> <p>(7) Corrective Actions: Provided the MR Structures Monitoring Program is conducted under 10 CFR 50, Appendix B (Quality Assurance), the Corrective Action requirement of Criterion 7 is satisfied.</p> <p>(8) Confirmation Process: Provided the MR Structures Monitoring Program is conducted under 10 CFR 50, Appendix B (Quality Assurance), the Confirmation requirement of Criterion 8 is satisfied.</p>	

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>adequate. Specific open and confirmatory items are identified where these programs fall short of completely satisfying the ten criteria. Prospective applicants for License Renewal may review the Calvert Cliffs and Oconee applications/SERs, for examples of structures monitoring programs which were credited for License Renewal.</p>	<p>(9) Administrative Controls: Provided the MR Structures Monitoring Program is conducted under 10CFR50 Appendix B (Quality Assurance), the Administrative Controls requirement of Criterion 9 is satisfied.</p> <p>(10) Operating Experience: MR Structures Monitoring Programs to detect and correct aging degradation which threatens intended functions have only recently been implemented. At this time, it appears that MR Structures Monitoring should be an effective program, provided the details of licensee-specific programs adequately address Criteria 1, 3, 4, and 6.</p> <p style="text-align: center; font-size: 2em;">All-Comment #84</p>	

III. STRUCTURES AND COMPONENTS SUPPORTS

B1.2 Supports for ASME Class 2, 3 and MC Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B1.2.1	Class 2, 3, MC Piping and component supports	Support Members; Anchor Bolts; Welds	Carbon Steel	Inside contain- ment/ Outside contain- ment	Loss of Material	Environ- mental corrosion (i.e. pitting corrosion, general corrosion, etc.) ↓ Elev	10CFR50.55a ASME Section XI, Subsection 1WF, 1989
B1.2.1	Class 2, 3, MC Piping and component supports	Support Members; Anchor Bolts; Welds	Carbon Steel	Inside PWR contain- ment	Loss of Material	Boric Acid Corrosion	<i>Same as effect of boric acid corrosion on Class 1 piping and component supports (B1.1.1)</i>

III. STRUCTURES AND COMPONENTS SUPPORTS

B1.2 Supports for ASME Class 2, 3 and MC Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>10CFR50.55a imposes the inservice inspection requirements of ASME B&PV Code Section XI on Class 1, 2, and 3 piping and components and their associated supports. Inservice inspection of supports is covered in Subsection IWF. Therefore, ASME Code Section XI, Subsection IWF, constitutes an existing, mandated program which may be credited for managing aging of supports for license renewal.</p> <p style="text-align: center;">359</p>	<p>(1) Scope of Program: IWF (1989 Edition) refers to IWC, IWD, and IWE for the inspection scope and schedule. It can be inferred from Table IWC-2500-1, Examination Categories C-F-1 and C-F-2 that only 7.5% of non-exempted supports are subject to examination for Class 2 systems. The same supports are inspected in each 10 year inspection interval. No specific numerical percentages are inferred in IWD and IWE for Class 3 and Class MC respectively.</p> <p>For other 9 criteria as delineated in draft SRP-LR (i.e., from (2) Preventative Action to (10) Operating Experience), same as effect of environmental corrosion on Class 1 piping and component supports (B1.1.1)</p> <p>See Chapter XI for an evaluation of ASME Section XI, Subsection IWF</p>	<p>No</p>
<p>Same as effect of boric acid corrosion on Class 1 piping and component supports (B1.1.1)</p> <p>Boric Acid Corrosion Program</p> <p style="text-align: center;">87</p>	<p>Same as effect of boric acid corrosion on Class 1 piping and component supports (B1.1.1)</p> <p>See Chapter XI for an evaluation of the Boric Acid Corrosion Program</p>	<p>Same as effect of boric acid corrosion on Class 1 piping and component supports (B1.1.1)</p> <p>NO, provided visual inspection of adjacent areas is included in applicants program. Otherwise, plant specific evaluation will be required.</p>

III. STRUCTURES AND COMPONENTS SUPPORTS
B1.2 Supports for ASME Class 2, 3 and MC Piping and Components

Item	Structure/Component	Region of Interest	Material	Environment	Aging Effect	Aging Mechanism	References
B1.2.1	Class 2, 3, MC Piping and component supports <i>Excluding integral attachments per the Code</i>	Support Members; Anchor Bolts; Welds	Carbon Steel	Inside containment/ Outside containment	Cracking initiation and Growth	Fatigue	<i>Same as effect of fatigue on Class 1 piping and component supports (B1.1.1)</i>
B1.2.2	Class 2, 3, MC Piping and component supports <i>Excluding integral attachments per the Code</i>	Constant and variable load spring hangers; guides; stops; sliding surfaces; design clearances; vibration isolators	Steel and other	Inside containment/ Outside containment	Loss of mechanical function	Corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads; elastomer hardening	<i>Same as effect of corrosion, distortion, dirt etc. on Class 1 piping and component supports (B1.1.3)</i>

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III. STRUCTURES AND COMPONENTS SUPPORTS
 B1.2 Supports for ASME Class 2, 3 and MC Piping and Components

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Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Same as effect of fatigue on Class 1 piping and component supports (B1.1.1) ASME Section XI, Subsection IWF</p>	<p>Same as effect of fatigue on Class 1 piping and component supports (B1.1.1) See Chapter XI for an evaluation of ASME Section XI, Subsection IWF</p>	<p>Same as effect of fatigue on Class 1 piping and component supports (B1.1.1) NO</p>
<p>Some supports may have been designed for a finite number of load cycles, per Section III, Subsection NF, based on a 40 year design life.</p>	<p>Supports designed for a specific number of load cycles will require a TLAA to demonstrate adequacy for the renewal license period.</p>	<p>Yes. Possible TLAA.</p>
<p>Same as effect of corrosion, distortion, dirt etc. on Class 1 piping and component supports (B1.1.3)</p> <p>HERE ALSO →</p>	<p>Same as effect of corrosion, distortion, dirt etc. on Class 1 piping and component supports (B1.1.3)</p>	<p>Same as effect of corrosion, distortion, dirt etc. on Class 1 piping and component supports (B1.1.3) NO</p>

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III. STRUCTURES AND COMPONENTS SUPPORTS

B1.2 Supports for ASME Class 2, 3 and MC Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B1.2.3	Class 2, 3, MC Piping and component supports <i>Detail</i> 	Building concrete surround- ing anchor bolts; Grout pads	Reinforced concrete and grout	Inside contain- ment/ Outside contain- ment	Reduction in concrete anchor capacity	Concrete degradation due to vibratory loads or other effects	<i>Same as effect of concrete degradation on Class 1 piping and component supports (B1.1.4)</i>

III. STRUCTURES AND COMPONENTS SUPPORTS

B1.2 Supports for ASME Class 2, 3 and MC Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Same as effect of concrete degradation on Class 1 piping and component supports (B1.1.4)</p>	<p>Same as effect of concrete degradation on Class 1 piping and component supports (B1.1.4)</p> <p>ACL CMT # 110</p>	<p>Same as effect of concrete degradation on Class 1 piping and component supports (B1.1.4)</p>

B2. Supports for Cable Trays, Conduit, HVAC Ducts, TubeTrack, Instrument Tubing, Non-ASME Piping and Components

B2.1 Support Members; Anchor Bolts; Welds

B2.2 Bolted Friction Connections (e.g. Struts)

B2.3 Building Concrete Surrounding Anchor Bolts; Grout Pads

B2. Supports for Cable Trays, Conduit, HVAC Ducts, TubeTrack, Instrument Tubing, Non-ASME Piping and Components

Systems, Structures, and Components

Review Table III B2 addresses supports/anchorage for cable trays, conduit, HVAC ducts, Tube Track, instrument tubing, and non-ASME piping/components. Component supports are not specifically addressed in the draft Standard Review Plan for License Renewal (SRP-LR). Regions of interest and applicable aging effects are identified in the Table. The aging management review is presented for each region of interest /aging effect combination.

System Interfaces

Physical interfaces exist with the structure, system or component being supported and with the building structural element to which the support is anchored. The primary functional interface is to ensure adequate anchorage of the supported element during internal/external design basis events, so that the supported element can perform its intended function.

III. STRUCTURES AND COMPONENT SUPPORTS

B2 Supports for Cable Trays, Conduit, HVAC Ducts, Tube Track, Instrument Tubing, Non-ASME Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B2.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside contain- ment/ Outside contain- ment	Loss of Material	Environ- mental Corrosion (i.e. pitting corrosion, general corrosion, etc.)	10CFR50.65 NUMARC 93-01, Revision 2 Regulatory Guide 1.160 (formerly Draft DG-1051

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III. STRUCTURES AND COMPONENT SUPPORTS
B2 Supports for Cable Trays, Conduit, HVAC Ducts, Tube Track, Instrument Tubing, Non-ASME Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Maintenance Rule (10CFR50.65) -Structures monitoring</p> <p>The "Maintenance Rule" is intended to monitor the effectiveness of maintenance activities in nuclear power plants. It focuses on the adequacy of preventive and corrective maintenance activities.</p> <p>10CFR50.65 requires each licensee to develop and implement a program to verify that the current licensing basis (CLB) is maintained through periodic testing and inspection of critical plant structures, systems, and components. The nuclear power industry, through the Nuclear Energy Institute (NEI), has developed guidance for the development of such programs. Rev. 2 to NUMARC 93-01 was issued in April 1996. USNRC Regulatory Guide 1.160, Rev. 2, issued in March 1997, identifies this document as an acceptable approach to meeting the objectives of 10CFR50.65.</p> <p>Revision 2 to NUMARC 93-01 added Section 10.2.3, "Monitoring the Condition of Structures." It emphasizes the importance of monitoring the condition of plant structures. Quoting from this report, "Monitoring the condition of structures, like systems and components, should be predictive in nature and provide early warning of degradation. The baseline condition of plant structures should be established to facilitate condition monitoring activities."</p> <p>Regulatory Position 1.5 "Monitoring of Structures" in RG1.160, Rev. 2, states that the Maintenance Rule does not treat structures differently from systems and components. The attributes of an acceptable structure monitoring program are discussed.</p> <p>Structures Monitoring Programs developed to meet the requirements of 10CFR50.65 (Maintenance Rule) can be credited for addressing aging management of structures and structural components to meet the requirements of 10CFR54 (License Renewal). License</p>	<p>An applicant for License Renewal may reference its Structures Monitoring Program developed to meet the requirements of the Maintenance Rule (10CFR50.65), as further defined and clarified by NUMARC 93-01, Revision 2 and Regulatory Guide 1.160, Revision 2. The guidelines contained in these documents provide an adequate foundation for formulating licensee specific MR Structures Monitoring Programs. An applicant for License Renewal should confirm that its MR Structures Monitoring Program adequately manages the effects of aging so that the intended functions of structures and component supports will be maintained, consistent with the current licensing basis, for the period of extended operation. The applicant should assess its MR Structures Monitoring Program against the attributes of an acceptable aging management program. Evaluation of MR Structures Monitoring against the ten (10) criteria for an acceptable aging management program follows:</p> <p>(1) Scope of Program: The MR Structures Monitoring Program scope is defined by the licensee; it may or may not encompass all structures and structural components which must be reviewed for License Renewal. The applicant should clearly identify the structure/aging effect/aging mechanism combinations which are managed by the MR Structures Monitoring Program. For potential structure/aging effect/aging mechanism combinations not covered by the MR Structures Monitoring Program, the applicant should justify that it is not significant for the applicant's plant, or identify the applicable aging management program.</p> <p>(2) Preventive Actions: Inspection and maintenance of protective coatings which inhibit corrosion of steel structural elements should be included as part of Structures Monitoring. No specific preventive actions are identified for other aging mechanisms. (3) Parameters Monitored/Inspected: For MR Structures Monitoring Programs, specification of the parameters monitored or inspected is the responsibility of the licensee. For License Renewal, the specific parameters monitored or inspected should be linked to degradation of intended function(s) and should detect the presence and extent of aging effects. The inspection scope should include bolt/tightness checks for concrete expansion anchors subjected to vibratory loads. The applicant should confirm that its specification of parameters to be monitored or inspected is consistent with meeting Criterion 3.</p> <p>(4) Detection of Aging Effects: Detection of aging effects before there is loss of intended function requires that periodic inspection be conducted, utilizing appropriate inspection methods implemented by qualified inspectors. Under the Maintenance Rule, the inspection schedule, inspection methods and inspector qualifications are defined by the individual licensees. An applicant for License Renewal should confirm that these elements of its MR Structures Monitoring Program are consistent with meeting Criterion 4.</p>	<p>No, if within the scope of the applicant's MR Structures Monitoring Program. Otherwise, justification for non-applicability of details of plant-specific program need to be evaluated.</p>

III. STRUCTURES AND COMPONENT SUPPORTS

B2 Supports for Cable Trays, Conduit, HVAC Ducts, Tube Track, Instrument Tubing, Non-ASME Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B2.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside PWR contain- ment	Loss of Material	Boric Acid Corrosion	GL 88-05 IE Bulletin 82-02 IE IN 80-27 IE IN 86-108 Supplements 1, 2, and 3

III. STRUCTURES AND COMPONENT SUPPORTS

B2 Supports for Cable Trays, Conduit, HVAC Ducts, Tube Track, Instrument Tubing, Non-ASME Piping and Components

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Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Renewal applicants are encouraged to take credit for existing programs.</p> <p>A well formulated and documented structures monitoring program, in accordance with the guidance provided in NUMARC 93-01, Revision 2; and Regulatory Guide 1.160, Revision 2, should satisfy the requirements for an acceptable aging management program for License Renewal, when evaluated against the ten (10) criteria defined in Section 3.0 of the Draft SRP for License Renewal.</p> <p>The Calvert Cliffs and Oconee License Renewal applications do not directly take credit for structures monitoring under the Maintenance Rule. Plant-specific structures monitoring programs are identified and described, to demonstrate that adequate aging management programs are in place for structures and structural components. These programs were evaluated by the staff against the ten (10) criteria for an acceptable aging management program, defined in Section 3.0 of the Draft SRP-LR. For the most part, these programs are considered adequate. Specific open and confirmatory items are identified where these programs fall short of completely satisfying the ten criteria. Prospective applicants for License Renewal may review the Calvert Cliffs and Oconee applications/SERs, for examples of structures monitoring programs which were credited for License Renewal.</p>	<p>(5) Monitoring and Trending: Documentation and comparison of successive inspection results is needed to perform meaningful trending. An appropriate inspection schedule should be established to provide reasonable assurance that adequate monitoring and trending will be accomplished under the MR Structure Monitoring Program.</p> <p>(6) Acceptance Criteria: Acceptance criteria, against which the need for corrective action is evaluated, are not specified in the MR or its implementing documents. These criteria are defined on a licensee-specific basis. The acceptance criteria should be consistent with existing applicable codes and standards and/or good engineering practice. The applicant for License Renewal should confirm that the acceptance criteria utilized in its MR Structures Monitoring Program will provide for timely corrective action prior to loss of intended function and are consistent with meeting Criterion 6.</p> <p>(7) Corrective Actions: Provided the MR Structures Monitoring Program is conducted under 10 CFR 50, Appendix B (Quality Assurance), the Corrective Action requirement of Criterion 7 is satisfied.</p> <p>(8) Confirmation Process: Provided the MR Structures Monitoring Program is conducted under 10 CFR 50, Appendix B (Quality Assurance), the Confirmation requirement of Criterion 8 is satisfied.</p> <p>(9) Administrative Controls: Provided the MR Structures Monitoring Program is conducted under 10CFR50 Appendix B (Quality Assurance), the Administrative Controls requirement of Criterion 9 is satisfied.</p> <p>(10) Operating Experience: MR Structures Monitoring Programs to detect and correct aging degradation which threatens intended functions have only recently been implemented. At this time, it appears that MR Structures Monitoring should be an effective program, provided the details of licensee-specific programs adequately address Criteria 1, 3, 4, and 6.</p>	
<p>Generic Letter 88-05 Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants, March 17, 1988, mandates that PWR licensees monitor the condition of the reactor coolant pressure boundary for occurrences of borated water leakage. Periodic Visual Inspection of adjacent structures, components and supports for evidence of leakage and corrosion should be an element of the applicant's 88-05 monitoring program.</p>	<p>(1) Scope of Program: The primary coolant pressure boundary of PWR's, containing borated water, must be monitored for early detection of small leaks, in order to prevent significant loss of material from boric acid corrosion. Early detection and correction of leakage should protect adjacent structural elements (e.g., supports) from boric acid corrosion. (2) Preventative Action: This is primarily a monitoring program, in addition to any regular preventive maintenance.</p> <p>See Chapter XI for an evaluation of the Boric Acid Corrosion Program</p>	<p>No, provided visual inspection of adjacent areas is included in applicant's program. Otherwise, plant-specific evaluation will be required.</p>

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III. STRUCTURES AND COMPONENT SUPPORTS

B2 Supports for Cable Trays, Conduit, HVAC Ducts, Tube Track, Instrument Tubing, Non-ASME Piping and Components

Item	Structure/Component	Region of Interest	Material	Environment	Aging Effect	Aging Mechanism	References
B2.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside containment/ Outside containment	Cracking initiation and Growth	Fatigue	Same as B2.1, Loss of material due to Environmental Corrosion
B2.2	All <i>Delete</i>	Bolted friction connections (e.g., struts)	Steel	Inside containment/ Outside containment	Loose-ning/ slipping of connections	Thermal cycling/ vibration	Same as B2.1, Loss of material due to Environmental Corrosion
B2.3	All <i>110 Delete</i>	Building concrete surrounding anchor bolts; Grout pads	Reinforced concrete, grout, masonry	Inside containment/ Outside containment	Reduction in concrete anchor capacity	Concrete degradation due to vibratory loads or other effects	Same as B2.1, Loss of material due to Environmental Corrosion

III. STRUCTURES AND COMPONENT SUPPORTS

B2 Supports for Cable Trays, Conduit, HVAC Ducts, Tube Track, Instrument Tubing, Non-ASME Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>962</p> <p>MOVE TO CHAPTER K1</p> <p>87</p>	<p>(3) Parameters Monitored/Inspected: The required program includes 1) identification of locations where leaks smaller than technical specification limits can cause degradation of the pressure boundary by boric acid corrosion, and 2) development and implementation of procedures for locating small coolant leaks.</p> <p>(4) Detection: The mandated monitoring program includes methods for conducting examinations to detect leakage. Engineering evaluations are then performed to establish the impact on the reactor coolant pressure boundary when leakage is located. (5) Monitoring and Trending: No monitoring or trending activities for assessing the impact of boric acid corrosion on carbon steel reactor pressure boundary components in PWR plants are required by this monitoring program. (6) Acceptance Criteria: No acceptance criteria are specified by NRC monitoring program. Methods must be capable of detecting leaks smaller than technical specification limits. (7) Corrective Action: Corrective actions are taken to prevent recurrence of this type of corrosion. This includes modifications in design and operating procedures as necessary to reduce the probability of primary coolant leaks and the use of suitable corrosion resistant materials or the application of protective coatings/claddings. (8) Confirmation Process: Licenses were required to respond to GL 88-05 within 60 days providing assurances that the mandated program was in place or to be promptly implemented. (9) Administrative Control: The Licensees shall maintain records of the programs and results obtained. (10) Operating Experience: Objective evidence indicates that boric acid corrosion of steel supports and other structural elements is adequately managed by the existing program.</p>	
<p>Same as B2.1, Loss of material due to Environmental Corrosion.</p> <p>Maintenance Rule - 10 CFR 50.65 - Structures Monitoring</p>	<p>Same as B2.1, Loss of material due to Environmental Corrosion.</p> <p>See Chapter XI for an evaluation of the Maintenance Rule</p>	<p>Same as B2.1, Loss of material due to Environmental Corrosion.</p>
<p>Same as B2.1, Loss of material due to Environmental Corrosion.</p>	<p>Same as B2.1, Loss of material due to Environmental Corrosion.</p>	<p>Same as B2.1, Loss of material due to Environmental Corrosion.</p>
<p>Same as B2.1, Loss of material due to Environmental Corrosion.</p>	<p>Same as B2.1, Loss of material due to Environmental Corrosion.</p>	<p>Same as B2.1, Loss of material due to Environmental Corrosion.</p>

B3. Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation

B3.1 Support Members; Anchor Bolts; Welds

B3.2 Building Concrete Surrounding Anchor Bolts; Grout Pads

B3. Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation

Systems, Structures, and Components

Review Table III B3 addresses supports/anchorage for racks, panels, cabinets, and enclosures for electrical equipment and instrumentation. Component supports are not specifically addressed in the draft Standard Review Plan for License Renewal (SRP-LR). Regions of interest and applicable aging effects are identified in the Table. The aging management review is presented for each region of interest /aging effect combination.

System Interfaces

Physical interfaces exist with the structure, system or component being supported and with the building structural element to which the support is anchored. The primary functional interface is to ensure adequate anchorage of the supported element during internal/external design basis events, so that the supported element can perform its intended function.

III. STRUCTURES AND COMPONENT SUPPORTS

B3 Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B3.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside contain- ment/ Outside contain- ment	Loss of Material	Environ- mental Corrosion (i.e. general corrosion, pitting corrosion, etc.)	10CFR50.65 NUMARC 93-01, Revision 2 Regulatory Guide 1.160 (formerly Draft DG-1051)

Environ-
mental
Corrosion
(i.e.
general
corrosion,
pitting
corrosion,
etc.)

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III. STRUCTURES AND COMPONENT SUPPORTS

B3 Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Maintenance Rule (10CFR50.65) -Structures monitoring</p> <p>The "Maintenance Rule" is intended to monitor the effectiveness of maintenance activities in nuclear power plants. It focuses on the adequacy of preventive and corrective maintenance activities.</p> <p>10CFR50.65 requires each licensee to develop and implement a program to verify that the current licensing basis (CLB) is maintained through periodic testing and inspection of critical plant structures, systems, and components. The nuclear power industry, through the Nuclear Energy Institute (NEI), has developed guidance for the development of such programs. Rev. 2 to NUMARC 93-01 was issued in April 1996. USNRC Regulatory Guide 1.160, Rev. 2, issued in March 1997, identifies this document as an acceptable approach to meeting the objectives of 10CFR50.65.</p> <p>Revision 2 to NUMARC 93-01 added Section 10.2.3, "Monitoring the Condition of Structures." It emphasizes the importance of monitoring the condition of plant structures. Quoting from this report, "Monitoring the condition of structures, like systems and components, should be predictive in nature and provide early warning of degradation. The baseline condition of plant structures should be established to facilitate condition monitoring activities."</p> <p>Regulatory Position 1.5 "Monitoring of Structures" in RG1.160, Rev. 2, states that the Maintenance Rule does not treat structures differently from systems and components. The attributes of an acceptable structure monitoring program are discussed.</p> <p>Structures Monitoring Programs developed to meet the requirements of 10CFR50.65 (Maintenance Rule) can be credited for addressing aging management of structures and structural components to meet the requirements of 10CFR54 (License Renewal). License</p>	<p>An applicant for License Renewal may reference its Structures Monitoring Program developed to meet the requirements of the Maintenance Rule (10CFR50.65) as further defined and clarified by NUMARC 93-01, Revision 2 and Regulatory Guide 1.160, Revision 2. The guidelines contained in these documents provide an adequate foundation for formulating licensee-specific MR Structures Monitoring Programs. An applicant for License Renewal should confirm that its MR Structures Monitoring Program adequately manages the effects of aging so that the intended functions of structures and component supports will be maintained, consistent with the current licensing basis, for the period of extended operation. The applicant should assess its MR Structures Monitoring Program against the attributes of an acceptable aging management program. Evaluation of MR Structures Monitoring against the ten (10) criteria for an acceptable aging management program follows:</p> <p>(1) Scope of Program: The MR Structures Monitoring Program scope is defined by the licensee; it may or may not encompass all structures and structural components which must be reviewed for License Renewal. The applicant should clearly identify the structure/aging effect/aging mechanism combinations which are managed by the MR Structures Monitoring Program. For potential structure/aging effect/aging mechanism combinations not covered by the MR Structures Monitoring Program, the applicant should justify that it is not significant for the applicant's plant, or identify the applicable aging management program.</p> <p>(2) Preventive Actions: Inspection and maintenance of protective coatings which inhibit corrosion of steel structural elements should be included as part of Structures Monitoring. No specific preventive actions are identified for other aging mechanisms.</p> <p>(3) Parameters Monitored/Inspected: For MR Structures Monitoring Programs, specification of the parameters monitored or inspected is the responsibility of the licensee. For License Renewal, the specific parameters monitored or inspected should be linked to degradation of intended function(s) and should detect the presence and extent of aging effects. The inspection scope should include bolt-tightness checks for concrete expansion anchors subjected to vibratory loads. The applicant should confirm that its specification of parameters to be monitored or inspected is consistent with meeting Criterion 3.</p> <p>(4) Detection of Aging Effects: Detection of aging effects before there is loss of intended function requires that periodic inspection be conducted, utilizing appropriate inspection methods implemented by qualified inspectors. Under the Maintenance Rule, the inspection schedule, inspection methods and inspector qualifications are defined by the individual licensees. An applicant for License Renewal should confirm that these elements of its MR Structures Monitoring Program are consistent with meeting Criterion 4.</p>	<p>No, if within the scope of the applicant's MR Structures Monitoring Program. Otherwise, justification for non-applicability or details of plant-specific program need to be evaluated.</p>

III. STRUCTURES AND COMPONENT SUPPORTS

B3 Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References

III. STRUCTURES AND COMPONENT SUPPORTS

B3 Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Renewal applicants are encouraged to take credit for existing programs.</p> <p>A well formulated and documented structures monitoring program, in accordance with the guidance provided in NUMARC 93-01, Revision 2; and Regulatory Guide 1.160, Revision 2, should satisfy the requirements for an acceptable aging management program for License Renewal, when evaluated against the ten (10) criteria defined in Section 3.0 of the Draft SRP for License Renewal.</p> <p>The Calvert Cliffs and Oconee License Renewal applications do not directly take credit for structures monitoring under the Maintenance Rule. Plant-specific structures monitoring programs are identified and described, to demonstrate that adequate aging management programs are in place for structures and structural components. These programs were evaluated by the staff against the ten (10) criteria for an acceptable aging management program, defined in Section 3.0 of the Draft SRP-LR. For the most part, these programs are considered adequate. Specific open and confirmatory items are identified where these programs fall short of completely satisfying the ten criteria. Prospective applicants for License Renewal may review the Calvert Cliffs and Oconee applications/SERs, for examples of structures monitoring programs which were credited for License Renewal.</p>	<p>(5) Monitoring and Trending: Documentation and comparison of successive inspection results is needed to perform meaningful trending. An appropriate inspection schedule should be established to provide reasonable assurance that adequate monitoring and trending will be accomplished under the MR Structure Monitoring Program.</p> <p>(6) Acceptance Criteria: Acceptance criteria, against which the need for corrective action is evaluated, are not specified in the MR or its implementing documents. These criteria are defined on a licensee-specific basis. The acceptance criteria should be consistent with existing applicable codes and standards and/or good engineering practice. The applicant for License Renewal should confirm that the acceptance criteria utilized in its MR Structures Monitoring Program will provide for timely corrective action prior to loss of intended function and are consistent with meeting Criterion 6.</p> <p>(7) Corrective Actions: Provided the MR Structures Monitoring Program is conducted under 10 CFR 50, Appendix B (Quality Assurance), the Corrective Action requirement of Criterion 7 is satisfied.</p> <p>(8) Confirmation Process: Provided the MR Structures Monitoring Program is conducted under 10 CFR 50, Appendix B (Quality Assurance), the Confirmation requirement of Criterion 8 is satisfied.</p> <p>(9) Administrative Controls: Provided the MR Structures Monitoring Program is conducted under 10CFR50 Appendix B (Quality Assurance), the Administrative Controls requirement of Criterion 9 is satisfied.</p> <p>(10) Operating Experience: MR Structures Monitoring Programs to detect and correct aging degradation which threatens intended functions have only recently been implemented. At this time, it appears that MR Structures Monitoring should be an effective program, provided the details of licensee-specific programs adequately address Criteria 1, 3, 4, and 6.</p>	

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III. STRUCTURES AND COMPONENT SUPPORTS

B3 Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B3.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside PWR contain- ment	Loss of Material	Boric Acid Corrosion	NRC GL 88-05 IE Bulletin 82-02 IE IN 80-27 IE IN 86-108 Supplements 1,2, and 3
B3.2	All <i>Delete</i> <i>110</i>	Building concrete surround- ing anchor bolts; Grout pads	Reinforced concrete, grout, masonry	Inside contain- ment/ Outside contain- ment	Reduction in concrete anchor capacity	Concrete degradation	<i>Same as B3.1, Loss of material due to Environ- mental Corrosion</i>

III. STRUCTURES AND COMPONENT SUPPORTS

B3 Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Generic Letter 88-05 "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants," March 17, 1988 mandates that PWR licensees monitor the condition of the reactor coolant pressure boundary for occurrences of borated water leakage. Periodic Visual Inspection of adjacent structures, components and supports for evidence of leakage and corrosion should be an element of the applicant's 88-05 monitoring program.</p>	<p>(1) Scope of Program: The primary coolant pressure boundary of PWR's, containing borated water, must be monitored for early detection of small leaks, in order to prevent significant loss of material from boric acid corrosion. Early detection and correction of leakage should protect adjacent structural elements (e.g., supports) from boric acid corrosion. (2) Preventative Action: This is primarily a monitoring program, in addition to any regular preventive maintenance. (3) Parameters Monitored/Inspected: The required program includes 1) identification of locations where leaks smaller than technical specification limits can cause degradation of the pressure boundary by boric acid corrosion, and 2) development and implementation of procedures for locating small coolant leaks. (4) Detection: The mandated monitoring program includes methods for conducting examinations to detect leakage. Engineering evaluations are then performed to establish the impact on the reactor coolant pressure boundary when leakage is located. (5) Monitoring and Trending: No monitoring or trending activities for assessing the impact of boric acid corrosion on carbon steel reactor pressure boundary components in PWR plants are required by this monitoring program. (6) Acceptance Criteria: No acceptance criteria are specified by NRC monitoring program. Methods must be capable of detecting leaks smaller than technical specification limits. (7) Corrective Action: Corrective actions are taken to prevent recurrence of this type of corrosion. This includes modifications in design and operating procedures as necessary to reduce the probability of primary coolant leaks and the use of suitable corrosion resistant materials or the application of protective coatings/claddings. (8) Confirmation Process: Licenses were required to respond to GL 88-05 within 60 days providing assurances that the mandated program was in place or to be promptly implemented. (9) Administrative Control: The Licensees shall maintain records of the programs and results obtained. (10) Operating Experience: Objective evidence indicates that boric acid corrosion of steel supports and other structural elements is adequately managed by the existing program.</p>	<p>No, provided visual inspection of adjacent areas is included in applicant's program. Otherwise, plant-specific evaluation will be required.</p>
<p>Same as B3.1, Loss of material due to Environmental Corrosion</p>	<p>Same as B3.1, Loss of material due to Environmental Corrosion</p> <p>ALL CMT #110</p>	<p>Same as B3.1, Loss of material due to Environmental Corrosion</p>



B4. Supports for Miscellaneous Mechanical Equipment (e.g., Cranes, EDG, HVAC System Components)

B4.1 Support Members; Anchor Bolts; Welds

B4.2 Vibration Isolation Elements

B4.3 Building Concrete Surrounding Anchor Bolts; Grout Pads

B4. Supports for Miscellaneous Mechanical Equipment (e.g., Cranes, EDG, HVAC System Components)



Systems, Structures, and Components

Review Table III B4 addresses supports/anchorage for miscellaneous mechanical equipment. Component supports are not specifically addressed in the draft Standard Review Plan for License Renewal (SRP-LR). Regions of interest and applicable aging effects are identified in the Table. The aging management review is presented for each region of interest /aging effect combination.

System Interfaces

Physical interfaces exist with the structure, system or component being supported and with the building structural element to which the support is anchored. The primary functional interface is to ensure adequate anchorage of the supported element during internal/external design basis events, so that the supported element can perform its intended function.

III. STRUCTURES AND COMPONENTS SUPPORTS

B4 Supports for Miscellaneous Mechanical Equipment (e.g., Cranes, EDG, HVAC System Components)

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B4.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside contain- ment/ Outside contain- ment	Loss of Material	Environ- mental Corrosion (i.e., pitting corrosion, general corrosion, etc.)	10CFR50.65 NUMARC 93-01, Revision 2 Regulatory Guide 1.160 (formerly Draft DG-1051)

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III. STRUCTURES AND COMPONENTS SUPPORTS
B4 Supports for Miscellaneous Mechanical Equipment (e.g., Cranes, EDG, HVAC System Components)

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Maintenance Rule (10CFR50.65) -Structures monitoring</p> <p>The "Maintenance Rule" is intended to monitor the effectiveness of maintenance activities in nuclear power plants. It focuses on the adequacy of preventive and corrective maintenance activities.</p> <p>10CFR50.65 requires each licensee to develop and implement a program to verify that the current licensing basis (CLB) is maintained through periodic testing and inspection of critical plant structures, systems, and components. The nuclear power industry, through the Nuclear Energy Institute (NEI), has developed guidance for the development of such programs. Rev. 2 to NUMARC 93-01 was issued in April 1996. USNRC Regulatory Guide 1.160, Rev. 2, issued in March 1997, identifies this document as an acceptable approach to meeting the objectives of 10CFR50.65.</p> <p>Revision 2 to NUMARC 93-01 added Section 10.2.3, "Monitoring the Condition of Structures." It emphasizes the importance of monitoring the condition of plant structures. Quoting from this report, "Monitoring the condition of structures, like systems and components, should be predictive in nature and provide early warning of degradation. The baseline condition of plant structures should be established to facilitate condition monitoring activities."</p> <p>Regulatory Position 1.5 "Monitoring of Structures" in RG1.160, Rev. 2, states that the Maintenance Rule does not treat structures differently from systems and components. The attributes of an acceptable structure monitoring program are discussed.</p> <p>Structures Monitoring Programs developed to meet the requirements of 10CFR50.65 (Maintenance Rule) can be credited for addressing aging management of structures and structural components to meet the requirements of 10CFR54 (License Renewal). License</p>	<p>An applicant for License Renewal may reference its Structures Monitoring Program developed to meet the requirements of the Maintenance Rule (10CFR50.65), as further defined and clarified by NUMARC 93-01, Revision 2 and Regulatory Guide 1.160, Revision 2. The guidelines contained in these documents provide an adequate foundation for formulating licensee-specific MR Structures Monitoring Programs. An applicant for License Renewal should confirm that its MR Structures Monitoring Program adequately manages the effects of aging so that the intended functions of structures and component supports will be maintained, consistent with the current licensing basis, for the period of extended operation. The applicant should assess its MR Structures Monitoring Program against the attributes of an acceptable aging management program. Evaluation of MR Structures Monitoring against the ten (10) criteria for an acceptable aging management program follows:</p> <p>(1) Scope of Program: The MR Structures Monitoring Program scope is defined by the licensee; it may or may not encompass all structures and structural components which must be reviewed for License Renewal. The applicant should clearly identify the structure/aging effect/aging mechanism combinations which are managed by the MR Structures Monitoring Program. For potential structure/aging effect/aging mechanism combinations not covered by the MR Structures Monitoring Program, the applicant should justify that it is not significant for the applicant's plant, or identify the applicable aging management program.</p> <p>(2) Preventive Actions: Inspection and maintenance of protective coatings which inhibit corrosion of steel structural elements should be included as part of Structures Monitoring. No specific preventive actions are identified for other aging mechanisms.</p> <p>(3) Parameters Monitored/Inspected: For MR Structures Monitoring Programs, specification of the parameters monitored or inspected is the responsibility of the licensee. For License Renewal, the specific parameters monitored or inspected should be linked to degradation of intended function(s) and should detect the presence and extent of aging effects. The inspection scope should include bolt-tightness checks for concrete expansion anchors subjected to vibratory loads. The applicant should confirm that its specification of parameters to be monitored or inspected is consistent with meeting Criterion 3.</p> <p>(4) Detection of Aging Effects: Detection of aging effects before there is loss of intended function requires that periodic inspection be conducted, utilizing appropriate inspection methods implemented by qualified inspectors. Under the Maintenance Rule, the inspection schedule, inspection methods and inspector qualifications are defined by the individual licensees. An applicant for License Renewal should confirm that these elements of its MR Structures Monitoring Program are consistent with meeting Criterion 4.</p>	<p>No, if within the scope of the applicant's MR Structures Monitoring Program. Otherwise, justification for non-applicability or details of plant-specific program need to be evaluated.</p>

III. STRUCTURES AND COMPONENTS SUPPORTS

B4 Supports for Miscellaneous Mechanical Equipment (e.g., Cranes, EDG, HVAC System Components)

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B4.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside PWR contain- ment	Loss of Material	Boric Acid Corrosion	NRC GL 88-05 IE Bulletin 82-02 IE IN 80-27 IE IN 86-108 Supplements 1,2, and 3

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III. STRUCTURES AND COMPONENTS SUPPORTS
B4 Supports for Miscellaneous Mechanical Equipment (e.g., Cranes, EDG, HVAC System Components)

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Renewal applicants are encouraged to take credit for existing programs.</p> <p>A well formulated and documented structures monitoring program, in accordance with the guidance provided in NUMARC 93-01, Revision 2, and Regulatory Guide 1.160, Revision 2, should satisfy the requirements for an acceptable aging management program for License Renewal, when evaluated against the ten (10) criteria defined in Section 3.0 of the Draft SRP for License Renewal.</p> <p>The Calvert Cliffs and Oconee License Renewal applications do not directly take credit for structures monitoring under the Maintenance Rule. Plant-specific structures monitoring programs are identified and described, to demonstrate that adequate aging management programs are in place for structures and structural components. These programs were evaluated by the staff against the ten (10) criteria for an acceptable aging management program, defined in Section 3.0 of the Draft SRP-LR. For the most part, these programs are considered adequate. Specific open and confirmatory items are identified where these programs fall short of completely satisfying the ten criteria. Prospective applicants for License Renewal may review the Calvert Cliffs and Oconee applications/SERs, for examples of structures monitoring programs which were credited for License Renewal.</p>	<p>(5) Monitoring and Trending: Documentation and comparison of successive inspection results is needed to perform meaningful trending. An appropriate inspection schedule should be established to provide reasonable assurance that adequate monitoring and trending will be accomplished under the MR Structure Monitoring Program.</p> <p>(6) Acceptance Criteria: Acceptance criteria, against which the need for corrective action is evaluated, are not specified in the MR or its implementing documents. These criteria are defined on a licensee-specific basis. The acceptance criteria should be consistent with existing applicable codes and standards and/or good engineering practice. The applicant for License Renewal should confirm that the acceptance criteria utilized in its MR Structures Monitoring Program will provide for timely corrective action prior to loss of intended function and are consistent with meeting Criterion 6.</p> <p>(7) Corrective Actions: Provided the MR Structures Monitoring Program is conducted under 10 CFR 50, Appendix B (Quality Assurance), the Corrective Action requirement of Criterion 7 is satisfied.</p> <p>(8) Confirmation Process: Provided the MR Structures Monitoring Program is conducted under 10 CFR 50, Appendix B (Quality Assurance), the Confirmation requirement of Criterion 8 is satisfied.</p> <p>(9) Administrative Controls: Provided the MR Structures Monitoring Program is conducted under 10CFR50 Appendix B (Quality Assurance), the Administrative Controls requirement of Criterion 9 is satisfied.</p> <p>(10) Operating Experience: MR Structures Monitoring Programs to detect and correct aging degradation which threatens intended functions have only recently been implemented. At this time, it appears that MR Structures Monitoring should be an effective program, provided the details of licensee-specific programs adequately address Criteria 1, 3, 4, and 6.</p>	
<p>Generic Letter 88-05 "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants," March 17, 1988, mandates that PWR licensees monitor the condition of the reactor coolant pressure boundary for occurrences of borated water leakage. Periodic Visual Inspection of adjacent structures, components and supports for evidence of leakage and corrosion should be an element of the applicant's 88-05 monitoring program.</p>	<p>(1) Scope of Program: The primary coolant pressure boundary of PWR's, containing borated water, must be monitored for early detection of small leaks, in order to prevent significant loss of material from boric acid corrosion. Early detection and correction of leakage should protect adjacent structural elements (e.g., supports) from boric acid corrosion. (2) Preventative Action: This is primarily a monitoring program, in addition to any regular preventive maintenance. (3) Parameters Monitored/Inspected: The required program includes 1) identification of locations where leaks smaller than technical specification limits can cause degradation of the pressure boundary by boric acid corrosion, and 2) development and implementation of procedures for locating small coolant leaks.</p>	<p>No, provided visual inspection of adjacent areas is included in applicant's program. Otherwise, plant-specific evaluation will be required.</p>

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See Chapter XI for an evaluation of the Boric Acid Corrosion Program

III. STRUCTURES AND COMPONENTS SUPPORTS

B4 Supports for Miscellaneous Mechanical Equipment (e.g., Cranes, EDG, HVAC System Components)

Item	Structure/Component	Region of Interest	Material	Environment	Aging Effect	Aging Mechanism	References
B4.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside containment/ Outside containment	Cracking initiation and growth	Fatigue	Same as B4.1, Loss of material due to Environmental Corrosion
B4.2	All	Vibration isolation elements	Non-metallic/ rubber	Inside containment/ Outside containment	Reduction/ Loss of isolation function.	Radiation Hardening, Temperature, humidity, sustained vibratory loading	Same as B4.1, Loss of material due to Environmental Corrosion
B4.3	All	Building concrete surrounding anchor bolts; Grout pads	Reinforced concrete, grout, masonry	Inside containment/ Outside containment	Reduction in concrete anchor capacity	Concrete degradation due to vibratory loads or other effects	Same as B4.1, Loss of material due to Environmental Corrosion

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 Cracking initiation and growth

Delete
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III. STRUCTURES AND COMPONENTS SUPPORTS

B4 Supports for Miscellaneous Mechanical Equipment (e.g., Cranes, EDG, HVAC System Components)

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>MOVE TO CHAPTER XI</p> <p>362</p>	<p>(4) Detection: The mandated monitoring program includes methods for conducting examinations to detect leakage. Engineering evaluations are then performed to establish the impact on the reactor coolant pressure boundary when leakage is located. (5) Monitoring and Trending: No monitoring or trending activities for assessing the impact of boric acid corrosion on carbon steel reactor pressure boundary components in PWR plants are required by this monitoring program. (6) Acceptance Criteria: No acceptance criteria are specified by NRC monitoring program. Methods must be capable of detecting leaks smaller than technical specification limits. (7) Corrective Action: Corrective actions are taken to prevent recurrence of this type of corrosion. This includes modifications in design and operating procedures as necessary to reduce the probability of primary coolant leaks and the use of suitable corrosion resistant materials or the application of protective coatings/claddings. (8) Confirmation Process: Licenses were required to respond to GL 88-05 within 60 days providing assurances that the mandated program was in place or to be promptly implemented. (9) Administrative Control: The Licensees shall maintain records of the programs and results obtained. (10) Operating Experience: Objective evidence indicates that boric acid corrosion of steel supports and other structural elements is adequately managed by the existing program.</p>	
<p>Same as B4.1, Loss of material due to Environmental Corrosion</p> <p>Maintenance Rule - 10CFR50.65 - Structures Monitoring</p>	<p>Same as B4.1, Loss of material due to Environmental Corrosion</p> <p>See Chapter XI for an evaluation of the Maintenance Rule - 10CFR50.65 - Structures Monitoring</p>	<p>Same as B4.1, Loss of material due to Environmental Corrosion</p>
<p>Same as B4.1, Loss of material due to Environmental Corrosion</p> <p>ALSO</p>	<p>Same as B4.1, Loss of material due to Environmental Corrosion</p> <p>ALSO</p>	<p>Same as B4.1, Loss of material due to Environmental Corrosion</p>
<p>Same as B4.1, Loss of material due to Environmental Corrosion</p>	<p>Same as B4.1, Loss of material due to Environmental Corrosion</p>	<p>Same as B4.1, Loss of material due to Environmental Corrosion</p>

B5. Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

B5.1 Support Members; Anchor Bolts; Welds

B5.2 Building Concrete Surrounding Anchor Bolts; Grout Pads

B5. Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

Systems, Structures, and Components

Review Table III B5 addresses supports/anchorage for miscellaneous steel structures. Component supports are not specifically addressed in the draft Standard Review Plan for License Renewal (SRP-LR). Regions of interest and applicable aging effects are identified in the Table. The aging management review is presented for each region of interest /aging effect combination.

System Interfaces

Physical interfaces exist with the structure, system or component being supported and with the building structural element to which the support is anchored. The primary functional interface is to ensure adequate anchorage of the supported element during internal/external design basis events, so that the supported element can perform its intended function.

III. STRUCTURES AND COMPONENT SUPPORTS

B5 Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B5.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside contain- ment/ Outside contain- ment	Loss of Material	Environ- mental Corrosion (i.e. pitting corrosion, general corrosion, etc.)	10CFR50.65 NUMARC 93-01, Revision 2 Regulatory Guide 1.160 (formerly Draft DG-1051)

(i.e. pitting corrosion, general corrosion, etc.)

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III. STRUCTURES AND COMPONENT SUPPORTS
 B5 Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints,
 Jet Impingement Shields)

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Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Maintenance Rule (10CFR50.65) -Structures monitoring</p> <p>The "Maintenance Rule" is intended to monitor the effectiveness of maintenance activities in nuclear power plants. It focuses on the adequacy of preventive and corrective maintenance activities.</p> <p>10CFR50.65 requires each licensee to develop and implement a program to verify that the current licensing basis (CLB) is maintained through periodic testing and inspection of critical plant structures, systems, and components. The nuclear power industry, through the Nuclear Energy Institute (NEI), has developed guidance for the development of such programs. Rev. 2 to NUMARC 93-01 was issued in April 1996. USNRC Regulatory Guide 1.160, Rev. 2, issued in March 1997 identifies this document as an acceptable approach to meeting the objectives of 10CFR50.65.</p> <p>Revision 2 to NUMARC 93-01 added Section 10.2.3, "Monitoring the Condition of Structures." It emphasizes the importance of monitoring the condition of plant structures. Quoting from this report, "Monitoring the condition of structures, like systems and components, should be predictive in nature and provide early warning of degradation. The baseline condition of plant structures should be established to facilitate condition monitoring activities."</p> <p>Regulatory Position 1.5 "Monitoring of Structures" in RG1.160, Rev. 2, states that the Maintenance Rule does not treat structures differently from systems and components. The attributes of an acceptable structure monitoring program are discussed.</p> <p>Structures Monitoring Programs developed to meet the requirements of 10CFR50.65 (Maintenance Rule) can be credited for addressing aging management of structures and structural components to meet the requirements of 10CFR54 (License Renewal). License</p>	<p>An applicant for License Renewal may reference its Structures Monitoring Program developed to meet the requirements of the Maintenance Rule (10CFR50.65), as further defined and clarified by NUMARC 93-01, Revision 2 and Regulatory Guide 1.160, Revision 2. The guidelines contained in these documents provide an adequate foundation for formulating licensee-specific MR Structures Monitoring Programs. An applicant for License Renewal should confirm that its MR Structures Monitoring Program adequately manages the effects of aging so that the intended functions of structures and component supports will be maintained, consistent with the current licensing basis, for the period of extended operation. The applicant should assess its MR Structures Monitoring Program against the attributes of an acceptable aging management program. Evaluation of MR Structures Monitoring against the ten (10) criteria for an acceptable aging management program follows:</p> <p>(1) Scope of Program: The MR Structures Monitoring Program scope is defined by the licensee; it may or may not encompass all structures and structural components which must be reviewed for License Renewal. The applicant should clearly identify the structure/aging effect/aging mechanism combinations which are managed by the MR Structures Monitoring Program. For potential structure/aging effect/aging mechanism combinations not covered by the MR Structures Monitoring Program, the applicant should justify that it is not significant for the applicant's plant, or identify the applicable aging management program.</p> <p>(2) Preventive Actions: Inspection and maintenance of protective coatings which inhibit corrosion of steel structural elements should be included as part of Structures Monitoring. No specific preventive actions are identified for other aging mechanisms.</p> <p>(3) Parameters Monitored/Inspected: For MR Structures Monitoring Programs, specification of the parameters monitored or inspected is the responsibility of the licensee. For License Renewal, the specific parameters monitored or inspected should be linked to degradation of intended function(s) and should detect the presence and extent of aging effects. The inspection scope should include bolt-tightness checks for concrete expansion anchors subjected to vibratory loads. The applicant should confirm that its specification of parameters to be monitored or inspected is consistent with meeting Criterion 3.</p> <p>(4) Detection of Aging Effects: Detection of aging effects before there is loss of intended function requires that periodic inspection be conducted, utilizing appropriate inspection methods implemented by qualified inspectors. Under the Maintenance Rule, the inspection schedule, inspection methods and inspector qualifications are defined by the individual licensees. An applicant for License Renewal should confirm that these elements of its MR Structures Monitoring Program are consistent with meeting Criterion 4.</p>	<p>No, if within the scope of the applicant's MR Structures Monitoring Program. Otherwise, justification for non-applicability or details of plant-specific program need to be evaluated.</p>

III. STRUCTURES AND COMPONENT SUPPORTS

B5 Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References

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III. STRUCTURES AND COMPONENT SUPPORTS
B5 Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Renewal applicants are encouraged to take credit for existing programs.</p> <p>A well formulated and documented structures monitoring program, in accordance with the guidance provided in NUMARC 93-01, Revision 2; and Regulatory Guide 1.160, Revision 2, should satisfy the requirements for an acceptable aging management program for License Renewal, when evaluated against the ten (10) criteria defined in Section 3.0 of the Draft SRP for License Renewal.</p> <p>The Calvert Cliffs and Oconee License Renewal applications do not directly take credit for structures monitoring under the Maintenance Rule. Plant-specific structures monitoring programs are identified and described, to demonstrate that adequate aging management programs are in place for structures and structural components. These programs were evaluated by the staff against the ten (10) criteria for an acceptable aging management program, defined in Section 3.0 of the Draft SRP-LR. For the most part, these programs are considered adequate. Specific open and confirmatory items are identified where these programs fall short of completely satisfying the ten criteria. Prospective applicants for License Renewal may review the Calvert Cliffs and Oconee applications/SERs, for examples of structures monitoring programs which were credited for License Renewal.</p>	<p>(5) Monitoring and Trending: Documentation and comparison of successive inspection results is needed to perform meaningful trending. An appropriate inspection schedule should be established to provide reasonable assurance that adequate monitoring and trending will be accomplished under the MR Structure Monitoring Program.</p> <p>(6) Acceptance Criteria: Acceptance criteria, against which the need for corrective action is evaluated, are not specified in the MR or its implementing documents. These criteria are defined on a licensee-specific basis. The acceptance criteria should be consistent with existing applicable codes and standards and/or good engineering practice. The applicant for License Renewal should confirm that the acceptance criteria utilized in its MR Structures Monitoring Program will provide for timely corrective action prior to loss of intended function and are consistent with meeting Criterion 6.</p> <p>(7) Corrective Actions: Provided the MR Structures Monitoring Program is conducted under 10 CFR 50, Appendix B (Quality Assurance), the Confirmation requirement of Criterion 8 is satisfied.</p> <p>(9) Administrative Controls: Provided the MR Structures Monitoring Program is conducted under 10CFR50 Appendix B (Quality Assurance), the Administrative Controls requirement of Criterion 9 is satisfied.</p> <p>(9) Administrative Controls: Provided the MR Structures Monitoring Program is conducted under 10CFR50 Appendix B (Quality Assurance), the Administrative Controls requirement of Criterion 9 is satisfied.</p> <p>(10) Operating Experience: MR Structures Monitoring Programs to detect and correct aging degradation which threatens intended functions have only recently been implemented. At this time, it appears that MR Structures Monitoring should be an effective program, provided the details of licensee-specific programs adequately address Criteria 1, 3, 4, and 6.</p>	

III. STRUCTURES AND COMPONENT SUPPORTS

B5 Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B5.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside PWR contain- ment	Loss of Material	Boric Acid Corrosion	NRC GL 88-05 IE Bulletin 82-02 IE IN 80-27 IE IN 86-108 Supplements 1,2, and 3
B5.2	All <i>Delete</i> <i>110</i>	Building concrete surround- ing anchor bolts; Grout pads	Reinforced concrete, grout, masonry	Inside contain- ment/ Outside contain- ment	Reduction in concrete anchor capacity	Concrete degradation	<i>Same as B5.1, Loss of material due to Environ- mental Corrosion</i>

III. STRUCTURES AND COMPONENT SUPPORTS

B5 Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Generic Letter 88-05 "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants," March 17, 1988 mandates that PWR licensees monitor the condition of the reactor coolant pressure boundary for occurrences of boric acid corrosion. Periodic visual inspection of adjacent structures, components and supports for evidence of leakage and corrosion should be an element of the applicant's 88-05 monitoring program.</p> <p>362</p>	<p>(1) Scope of Program: The primary coolant pressure boundary of PWR's, containing boric acid, must be monitored for early detection of small leaks, in order to prevent significant loss of material from boric acid corrosion. Early detection and correction of leakage should protect adjacent structural elements (e.g., supports) from boric acid corrosion. (2) Preventive Action: This is primarily a monitoring program, in addition to any regular preventive maintenance. (3) Parameters Monitored/Inspected: The required program includes 1) identification of locations where leaks smaller than technical specification limits can cause degradation of the pressure boundary by boric acid corrosion, and 2) development and implementation of procedures for locating small coolant leaks. (4) Detection: The mandated monitoring program includes methods for conducting examinations to detect leakage. Engineering evaluations are then performed to establish the impact on the reactor coolant pressure boundary when leakage is located. (5) Monitoring and Trending: No monitoring or trending activities for assessing the impact of boric acid corrosion on carbon steel reactor pressure boundary components in PWR plants are required by this monitoring program. (6) Acceptance Criteria: No acceptance criteria are specified by NRC monitoring program. Methods must be capable of detecting leaks smaller than technical specification limits. (7) Corrective Action: Corrective actions are taken to prevent recurrence of this type of corrosion. This includes modifications in design and operating procedures as necessary to reduce the probability of primary coolant leaks and the use of suitable corrosion resistant materials or the application of protective coatings/claddings. (8) Confirmation Process: Licenses were required to respond to GL 88-05 within 60 days providing assurances that the mandated program was in place or to be promptly implemented. (9) Administrative Control: The Licensees shall maintain records of the programs and results obtained. (10) Operating Experience: Objective evidence indicates that boric acid corrosion of steel supports and other structural elements is adequately managed by the existing program.</p>	<p>No, provided visual inspection of adjacent areas is included in applicant's program. Otherwise, plant-specific evaluation will be required.</p>
<p>Same as B5.1, Loss of material due to Environmental Corrosion</p>	<p>Same as B5.1, Loss of material due to Environmental Corrosion</p> <p>ALL COMMENT #110</p>	<p>Same as B5.1, Loss of material due to Environmental Corrosion</p>

CHAPTER III B

COMPONENT SUPPORTS

Major Component Supports

- B1. Supports for ASME Class Piping and Components
- B2. Supports for Cable Trays, Conduit, HVAC Ducts, TubeTrack, Instrument Tubing, Non-ASME Piping and Components
- B3. Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation
- B4. Supports for Miscellaneous Mechanical Equipment (e.g., Cranes, EDG, HVAC System Components)
- B5. Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

B1. Supports for ASME Class Piping and Components

B1.1 Class 1

B1.1.1 Support Members; Anchor Bolts; Welds

B1.1.2 High Strength Bolting for Major NSSS Component Supports

B1.1.3 Constant/Variable Load Spring Hangers; Guides; Stops; Sliding Surfaces; Design Clearances

B1.1.4 Building Concrete Surrounding Anchor Bolts; Grout Pads

B1.2 Class 2, 3 and MC

B1.2.1 Support Members; Anchor Bolts; Welds

B1.2.2 Constant/Variable Load Spring Hangers; Guides; Stops; Sliding Surfaces; Design Clearances

B1.2.3 Building Concrete Surrounding Anchor Bolts; Grout Pads

B1. Supports for ASME Class Piping and Components

Systems, Structures, and Components

Review Table III B1 addresses supports/anchorage for ASME Class piping systems and associated components. B1 is further subdivided into Class 1 (B1.1) and Class 2, 3, and MC (B1.2). Component supports are not specifically addressed in the draft Standard Review Plan for License Renewal (SRP-LR).

Regions of interest and applicable aging effects are identified in the Table. The aging management review is presented for each region of interest /aging effect combination.

System Interfaces

Physical interfaces exist with the structure, system or component being supported and with the building structural element to which the support is anchored. The primary functional interface is to ensure adequate anchorage of the supported element during internal/external design basis events, so that the supported element can perform its intended function.

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B1.1.1	Class 1 Piping and component supports excluding integral attachments per the Code.	Support Members; Anchor Bolts; Welds	Carbon Steel	Inside Containment	Loss of Material	Environmental Corrosion (i.e., pitting corrosion, general corrosion, etc.)	10CFR50.55a ASME Section XI, Subsection IWF, 1989

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
ASME Section XI, Subsection IWF.	See Chapter XI for an evaluation of ASME Section XI, Subsection IWF.	No

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B1.1.1	Class 1 Piping and component supports	Support Members; Anchor Bolts; Welds	Carbon Steel	Inside PWR Contain- ment	Loss of Material	Boric Acid Corrosion	NRC GL 88-05 IE Bulletin 82-02 IE IN 80-27 IE IN 86-108 Supplements 1,2, and 3
B1.1.1	Class 1 Piping and component supports	Support Members; Anchor Bolts; Welds	Carbon Steel	Inside Contain- ment	Cracking	Fatigue	10CFR50.55a ASME Section XI, Subsection IWF, 1989 ASME Section III, Subsection NF

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
Boric Acid Corrosion Program	See Chapter XI for an evaluation of the Boric Acid Corrosion program.	No, provided visual inspection of adjacent areas is included in applicant's program. Otherwise, plant-specific evaluation will be required.
ASME Section XI, Subsection IWF.	See Chapter XI for an evaluation of ASME Section XI, Subsection IWF.	No

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B1.1.2	Class 1 Piping and component supports	High strength bolting for major NSSS component supports	Low alloy steel, tensile strength >150 ksi	Inside contain- ment	Cracking	Stress corrosion cracking	NRC GL 91-17 EPRI NP-5769 NUREG-1339 IE Bulletin 74-03 IE Bulletin 82-02

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
ASME Code Section XI, Subsection IWF.	See Chapter XI for an evaluation of ASME Section XI, Subsection IWF.	No

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B1.1.3	Class 1 Piping and component supports	Constant and variable load spring hangers; guides; stops; sliding surfaces; design clearances; vibration isolators	Steel and other	Inside contain- ment	Loss of mecha- nical function	Corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads; elastomer hardening	10CFR50.55a ASME Section XI, Subsection IWF, 1989
B1.1.4	Class 1 Piping and component supports excluding integral attachment s per the Code	Building concrete surround- ing anchor bolts; Grout pads	Reinforced concrete and grout	Inside contain- ment	Reduction in concrete anchor capacity	Vibration	10CFR50.65 NUMARC 93-01, Revision 2 NRC Regulatory Guide 1.160 (formerly Draft DG-1051)

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
ASME Section XI, Subsection IWF.	See Chapter XI for an evaluation of ASME Section XI, Subsection IWF.	No
Maintenance Rule (10CFR50.65) -Structures monitoring	See Chapter XI for an evaluation of the Maintenance Rule (10CFR50.65) – Structures monitoring	No, if within the scope of the applicant's MR Structures Monitoring Program. Otherwise, justification for non-applicability or details of plant-specific program need to be evaluated.

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References

III. STRUCTURES AND COMPONENT SUPPORTS

B1.1 Supports for ASME Class 1 Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation

III. STRUCTURES AND COMPONENTS SUPPORTS

B1.2 Supports for ASME Class 2, 3 and MC Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B1.2.1	Class 2, 3, MC Piping and component supports	Support Members; Anchor Bolts; Welds	Carbon Steel	Inside contain- ment/ Outside contain- ment	Loss of Material	Environ- mental corrosion (i.e. pitting corrosion, general corrosion, etc.)	10CFR50.55a ASME Section XI, Subsection 1WF, 1989
B1.2.1	Class 2, 3, MC Piping and component supports	Support Members; Anchor Bolts; Welds	Carbon Steel	Inside PWR contain- ment	Loss of Material	Boric Acid Corrosion	<i>Same as effect of boric acid corrosion on Class 1 piping and component supports (B1.1.1)</i>

III. STRUCTURES AND COMPONENTS SUPPORTS

B1.2 Supports for ASME Class 2, 3 and MC Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
ASME Section XI, Subsection IWF.	See Chapter XI for an evaluation of ASME Section XI, Subsection IWF.	No
Boric Acid Corrosion Program	See Chapter XI for an evaluation of the Boric Acid Corrosion program.	No, provided visual inspection of adjacent areas is included in applicant's program. Otherwise, plant-specific evaluation will be required

III. STRUCTURES AND COMPONENTS SUPPORTS

B1.2 Supports for ASME Class 2, 3 and MC Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B1.2.1	Class 2, 3, MC Piping and component supports excluding integral attachments per the code.	Support Members; Anchor Bolts; Welds	Carbon Steel	Inside containment/ Outside containment	Cracking	Fatigue	<i>Same as effect of fatigue on Class 1 piping and component supports (B1.1.1)</i>
B1.2.2	Class 2, 3, MC Piping and component supports excluding integral attachments per the Code	Constant and variable load spring hangers; guides; stops; sliding surfaces; design clearances; vibration isolators	Steel and other	Inside containment/ Outside containment	Loss of mechanical function	Corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads; elastomer hardening	<i>Same as effect of corrosion, distortion, dirt etc. on Class 1 piping and component supports (B1.1.3)</i>

III. STRUCTURES AND COMPONENTS SUPPORTS

B1.2 Supports for ASME Class 2, 3 and MC Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
10CFR50.55a/ASME Section XI, Subsection IWF	See Chapter XI for an evaluation of 10CFR50.55a/ASME Section XI, Subsection IWF.	No
10CFR50.55a/ASME Section XI, Subsection IWF	See Chapter XI for an evaluation of 10CFR50.55a/ASME Section XI, Subsection IWF.	No

III. STRUCTURES AND COMPONENTS SUPPORTS

B1.2 Supports for ASME Class 2, 3 and MC Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References

III. STRUCTURES AND COMPONENTS SUPPORTS

B1.2 Supports for ASME Class 2, 3 and MC Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation

B2. Supports for Cable Trays, Conduit, HVAC Ducts, TubeTrack, Instrument Tubing, Non-ASME Piping and Components

- B2.1 Support Members; Anchor Bolts; Welds
- B2.2 Bolted Friction Connections (e.g. Struts)
- B2.3 Building Concrete Surrounding Anchor Bolts; Grout Pads

B2. Supports for Cable Trays, Conduit, HVAC Ducts, TubeTrack, Instrument Tubing, Non-ASME Piping and Components

Systems, Structures, and Components

Review Table III B2 addresses supports/anchorage for cable trays, conduit, HVAC ducts, Tube Track, instrument tubing, and non-ASME piping/components. Component supports are not specifically addressed in the draft Standard Review Plan for License Renewal (SRP-LR). Regions of interest and applicable aging effects are identified in the Table. The aging management review is presented for each region of interest /aging effect combination.

System Interfaces

Physical interfaces exist with the structure, system or component being supported and with the building structural element to which the support is anchored. The primary functional interface is to ensure adequate anchorage of the supported element during internal/external design basis events, so that the supported element can perform its intended function.

III. STRUCTURES AND COMPONENT SUPPORTS

B2 Supports for Cable Trays, Conduit, HVAC Ducts, Tube Track, Instrument Tubing, Non-ASME Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B2.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside contain- ment/ Outside contain- ment	Loss of Material	Environ- mental Corrosion (i.e., pitting corrosion, general corrosion, etc.)	10CFR50.65 NUMARC 93-01, Revision 2 Regulatory Guide 1.160 (formerly Draft DG-1051

III. STRUCTURES AND COMPONENT SUPPORTS

B2 Supports for Cable Trays, Conduit, HVAC Ducts, Tube Track, Instrument Tubing, Non-ASME Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Maintenance Rule (10CFR50.65) -Structures monitoring</p>	<p>See Chapter XI for an evaluation of the Maintenance Rule (10CFR50.65) - Structures monitoring</p>	<p>No, if within the scope of the applicant's MR Structures Monitoring Program. Otherwise, justification for non-applicability or details of <u>plant-specific</u> program need to be evaluated.</p>

III. STRUCTURES AND COMPONENT SUPPORTS

B2 Supports for Cable Trays, Conduit, HVAC Ducts, Tube Track, Instrument Tubing, Non-ASME Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B2.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside PWR contain- ment	Loss of Material	Boric Acid Corrosion	GL 88-05 IE Bulletin 82-02 IE IN 80-27 IE IN 86-108 Supplements 1, 2, and 3

III. STRUCTURES AND COMPONENT SUPPORTS

B2 Supports for Cable Trays, Conduit, HVAC Ducts, Tube Track, Instrument Tubing, Non-ASME Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
Boric Acid Corrosion program.	See Chapter XI for an evaluation of the Boric Acid Corrosion program.	No, provided visual inspection of adjacent areas is included in applicant's program. Otherwise, plant-specific evaluation will be required.

III. STRUCTURES AND COMPONENT SUPPORTS

B2 Supports for Cable Trays, Conduit, HVAC Ducts, Tube Track, Instrument Tubing, Non-ASME Piping and Components

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B2.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside contain- ment/ Outside contain- ment	Cracking	Fatigue	<i>Same as B2.1, Loss of material due to Environ- mental Corrosion</i>

III. STRUCTURES AND COMPONENT SUPPORTS

B2 Supports for Cable Trays, Conduit, HVAC Ducts, Tube Track, Instrument Tubing, Non-ASME Piping and Components

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
Maintenance Rule (10CFR50.65) - Structures monitoring	See Chapter XI for an evaluation of the Maintenance Rule (10CFR50.65) - Structures monitoring.	No

B3. Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation

B3.1 Support Members; Anchor Bolts; Welds

B3.2 Building Concrete Surrounding Anchor Bolts; Grout Pads

B3. Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation

Systems, Structures, and Components

Review Table III B3 addresses supports/anchorage for racks, panels, cabinets, and enclosures for electrical equipment and instrumentation. Component supports are not specifically addressed in the draft Standard Review Plan for License Renewal (SRP-LR). Regions of interest and applicable aging effects are identified in the Table. The aging management review is presented for each region of interest /aging effect combination.

System Interfaces

Physical interfaces exist with the structure, system or component being supported and with the building structural element to which the support is anchored. The primary functional interface is to ensure adequate anchorage of the supported element during internal/external design basis events, so that the supported element can perform its intended function.

III. STRUCTURES AND COMPONENT SUPPORTS

B3 Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B3.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside contain- ment/ Outside contain- ment	Loss of Material	Environ- mental Corrosion (i.e., pitting corrosion, general corrosion, etc.)	10CFR50.65 NUMARC 93-01, Revision 2 Regulatory Guide 1.160 (formerly Draft DG-1051)

III. STRUCTURES AND COMPONENT SUPPORTS

B3 Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Maintenance Rule (10CFR50.65) -Structures monitoring</p>	<p>See Chapter XI for an evaluation of the Maintenance Rule (10CFR50.65) -Structures monitoring</p>	<p>No, if within the scope of the applicant's MR Structures Monitoring Program. Otherwise, justification for non-applicability or details of plant-specific program need to be evaluated.</p>

III. STRUCTURES AND COMPONENT SUPPORTS

B3 Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References

III. STRUCTURES AND COMPONENT SUPPORTS

B3 Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation

III. STRUCTURES AND COMPONENT SUPPORTS

B3 Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B3.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside PWR contain- ment	Loss of Material	Boric Acid Corrosion	NRC GL 88-05 IE Bulletin 82-02 IE IN 80-27 IE IN 86-108 Supplements 1,2, and 3

III. STRUCTURES AND COMPONENT SUPPORTS

B3 Anchorage of Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
Boric Acid Corrosion program.	See Chapter XI for an evaluation of the Boric Acid Corrosion.	No, provided visual inspection of adjacent areas is included in applicant's program. Otherwise, plant-specific evaluation will be required.

B4. Supports for Miscellaneous Mechanical Equipment (e.g., EDG, HVAC System Components)

B4.1 Support Members; Anchor Bolts; Welds

B4.2 Vibration Isolation Elements

B4.3 Building Concrete Surrounding Anchor Bolts; Grout Pads

B4. Supports for Miscellaneous Mechanical Equipment (e.g., EDG, HVAC System Components)

Systems, Structures, and Components

Review Table III B4 addresses supports/anchorage for miscellaneous mechanical equipment. Component supports are not specifically addressed in the draft Standard Review Plan for License Renewal (SRP-LR).

Regions of interest and applicable aging effects are identified in the Table. The aging management review is presented for each region of interest /aging effect combination.

System Interfaces

Physical interfaces exist with the structure, system or component being supported and with the building structural element to which the support is anchored. The primary functional interface is to ensure adequate anchorage of the supported element during internal/external design basis events, so that the supported element can perform its intended function.

III. STRUCTURES AND COMPONENTS SUPPORTS

B4 Supports for Miscellaneous Mechanical Equipment (e.g., Cranes, EDG, HVAC System Components)

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B4.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside containment/ Outside containment	Loss of Material	Environmental Corrosion (i.e., pitting corrosion, general corrosion, etc.)	10CFR50.65 NUMARC 93-01, Revision 2 Regulatory Guide 1.160 (formerly Draft DG-1051)

III. STRUCTURES AND COMPONENTS SUPPORTS

B4 Supports for Miscellaneous Mechanical Equipment (e.g., Cranes, EDG, HVAC System Components)

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Maintenance Rule (10CFR50.65) -Structures monitoring</p>	<p>See Chapter XI for an evaluation of Maintenance Rule (10CFR50.65) -Structures monitoring</p>	<p>No, if within the scope of the applicant's MR Structures Monitoring Program. Otherwise, justification for non-applicability or details of plant-specific program need to be evaluated.</p>

III. STRUCTURES AND COMPONENTS SUPPORTS

B4 Supports for Miscellaneous Mechanical Equipment (e.g., Cranes, EDG, HVAC System Components)

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B4.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside PWR contain- ment	Loss of Material	Boric Acid Corrosion	NRC GL 88-05 IE Bulletin 82-02 IE IN 80-27 IE IN 86-108 Supplements 1,2, and 3

III. STRUCTURES AND COMPONENTS SUPPORTS

B4 Supports for Miscellaneous Mechanical Equipment (e.g., Cranes, EDG, HVAC System Components)

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
Boric Acid Corrosion program.	See Chapter XI for an evaluation of the Boric Acid Corrosion program.	No provided visual inspection of adjacent areas is included in applicant's program. Otherwise, plant-specific evaluation will be required.

III. STRUCTURES AND COMPONENTS SUPPORTS

B4 Supports for Miscellaneous Mechanical Equipment (e.g., Cranes, EDG, HVAC System Components)

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B4.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside contain- ment/ Outside contain- ment	Cracking	Fatigue	<i>Same as B4.1, Loss of material due to Environ- mental Corrosion</i>
B4.2	All	Vibration isolation elements	Non- metallic/ rubber	Inside contain- ment/ Outside contain- ment	Reduc- tion/ Loss of isolation function	Radiation Hardening, Temper- ature, humidity, sustained vibratory loading	<i>Same as B4.1, Loss of material due to Environ- mental Corrosion</i>

III. STRUCTURES AND COMPONENTS SUPPORTS

B4 Supports for Miscellaneous Mechanical Equipment (e.g., Cranes, EDG, HVAC System Components)

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
Maintenance Rule (10CFR50.65) – Structures monitoring	See Chapter XI for an evaluation of the Maintenance Rule (10CFR50.65) - Structures monitoring	No, if within the scope of the applicant's MR Structures Monitoring Program. Otherwise, justification for non-applicability or details of plant-specific program need to be evaluated.
Maintenance Rule (10CFR50.65)	See Chapter XI for an evaluation of the Maintenance Rule (10CFR50.65) - Structures monitoring	See above

B5. Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

B5.1 Support Members; Anchor Bolts; Welds

B5.2 Building Concrete Surrounding Anchor Bolts; Grout Pads

B5. Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

Systems, Structures, and Components

Review Table III B5 addresses supports/anchorage for miscellaneous steel structures. Component supports are not specifically addressed in the draft Standard Review Plan for License Renewal (SRP-LR). Regions of interest and applicable aging effects are identified in the Table. The aging management review is presented for each region of interest /aging effect combination.

System Interfaces

Physical interfaces exist with the structure, system or component being supported and with the building structural element to which the support is anchored. The primary functional interface is to ensure adequate anchorage of the supported element during internal/external design basis events, so that the supported element can perform its intended function.

III. STRUCTURES AND COMPONENT SUPPORTS

B5 Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B5.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside contain- ment/ Outside contain- ment	Loss of Material	Environ- mental Corrosion (i.e., pitting corrosion, general corrosion, etc.)	10CFR50.65 NUMARC 93-01, Revision 2 Regulatory Guide 1.160 (formerly Draft DG-1051)

III. STRUCTURES AND COMPONENT SUPPORTS

B5 Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
<p>Maintenance Rule (10CFR50.65) -Structures monitoring</p>	<p>See Chapter XI for an evaluation of the Maintenance Rule (10CFR50.65)-Structures monitoring</p>	<p>No, if within the scope of the applicant's MR Structures Monitoring Program. Otherwise, justification for non-applicability or details of plant-specific program need to be evaluated.</p>

III. STRUCTURES AND COMPONENT SUPPORTS

B5 Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References

III. STRUCTURES AND COMPONENT SUPPORTS

B5 Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation

III. STRUCTURES AND COMPONENT SUPPORTS

B5 Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

Item	Structure/ Component	Region of Interest	Material	Environ- ment	Aging Effect	Aging Mechanism	References
B5.1	All	Support members; Anchor bolts; Welds	Carbon Steel	Inside PWR contain- ment	Loss of Material	Boric Acid Corrosion	NRC GL 88-05 IE Bulletin 82-02 IE IN 80-27 IE IN 86-108 Supplements 1,2, and 3

III. STRUCTURES AND COMPONENT SUPPORTS

B5 Supports for Miscellaneous Steel Structures (e.g., Platforms, Pipe Whip Restraints, Jet Impingement Shields)

Existing Aging Management Program (AMP)	Evaluation and Technical Basis	Further Evaluation
Boric Acid Corrosion program	See Chapter XI for an evaluation of the Boric Acid Corrosion program.	No

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- American Concrete Institute, ACI 318-63, "Building Code Requirements for Reinforced Concrete."
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- American Society of Mechanical Engineers, ASME Section III, *Rules for Construction of Nuclear Power Plant Components*, Division 1 - Subsection NF, *Component Supports*. The ASME Boiler and Pressure Vessel Code, The American Society of Mechanical Engineers, New York, NY.
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- IE Bulletin 82-02, "Degradation of Threaded Fasteners in the Reactor Coolant Pressure Boundary of PWR Plants," June 2, 1982.
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- NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary," March 17, 1988.
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- NRC Regulatory Guide 1.127, "Inspection of Water-Control Structures Associated with Nuclear Power Plants," Revision 1, March 1978.

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NUMARC 93-01, Revision 2: "Nuclear Energy Institute - Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants [Line-In/Line-Out Version]" April 1996.

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NUREG-1557, "Summary of Technical Information and Agreements from Nuclear Management and Resources Council Industry Reports Addressing License Renewal," October 1996.