

Audit and Review Plan
for
Plant Aging Management Programs and Reviews

Oyster Creek Generating Station
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**Audit and Review Plan
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Oyster Creek Generating Station

1. Introduction

By letter dated July 22, 2005 (ADAMS Accession Number ML0520800480), AmerGen Energy Company, LLC (AmerGen, the applicant) submitted to the U.S. Nuclear Regulatory Commission (NRC) its application for renewal of Operating License DPR-16 for Oyster Creek Generating Station (ML052080185). The applicant requested renewal of the operating license for an additional 20 years beyond the 40-year current license term.

In support of the staff's safety review of the license renewal application (LRA) for Oyster Creek Generating Station (OCGS), the License Renewal and Environmental Impacts Program, Section B (RLEP-B), will lead a project team that will audit and review selected aging management reviews (AMRs) and aging management programs (AMPs) developed by the applicant to support its LRA for OCGS. The project team will include NRC staff and engineers provided by Brookhaven National Laboratory (BNL), RLEP-B's technical assistance contractor. Appendix A, "Project Team Members," lists the project team members. This document is the RLEP-B plan for audit and review of assigned aging management reviews and aging management programs for OCGS.

The project team will audit and review its assigned AMPs and AMRs against the requirements of Title 10 of the *Code of Federal Regulations*, Part 54 (10 CFR Part 54), "Requirements for Renewal of Operating Licenses for Nuclear Power Plants;" the guidance provided in NUREG-1800, "Standard Review Plan for Review of License Renewal Application for Nuclear Power Plants" (SRP-LR); the guidance provided in NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," and this audit and review plan. For the scope of work defined in this audit and review plan, the project team will verify that the applicant's aging management activities and programs will adequately manage the effects of aging on structures and components, so that their intended functions will be maintained consistent with the OCGS current licensing basis (CLB) for the period of extended operation.

The project team will perform its work at NRC Headquarters, Rockville, Maryland; at Brookhaven National Laboratory offices in Upton, New York; and at the applicant's offices (OCGS site) in Forked River, New Jersey. The project team will perform its work in accordance with the schedule shown in Appendix B, "RLEP-B Schedule for LRA Safety Review." The project team will conduct a public exit meeting at the applicant's offices (OCGS site) in Forked River, New Jersey after it completes its on-site work.

This plan includes the following information:

- C **Introduction and Background.** Summary of the license renewal requirements, as stated in the *Code of Federal Regulations*, and a summary of the documents that the project team will use to conduct the audit and review process described in this plan.
- C **Objectives.** The objectives of the audits and reviews addressed by this audit and review plan.

- C **Summary of Information Provided in License Renewal Application.** Description of the information contained in the license renewal application for OCGS that is applicable to this plan.
- C **Overview of the Audit, Review, and Documentation Procedure.** Summary of the process that the project team will follow to conduct its audit and review of the OCGS LRA.
- C **Planning, Audit, Review, and Documentation Procedure.** The procedure that the project team will use to plan and schedule its work, to audit and review the OCGS LRA information that is within its scope of review, and to document the results of its work.
- C **Appendices.** Supporting information. The project team members are shown in Appendix A and the schedule is shown in Appendix B. The project team's work assignments are shown in Appendices C and D. Appendices E, F, and G are the worksheets that the individual project team members use to document the results of their audit and review audit work. The application of these worksheets is discussed in Section 6 of this audit and review plan. Appendix H is a list of the abbreviations and acronyms used in this audit and review plan.

2. Background

In 10 CFR 54.4, the scope of license renewal is defined as those structures, systems, and components (SSCs) (1) that are safety-related, (2) whose failure could affect safety-related functions, and (3) that are relied on to demonstrate compliance with the NRC's regulations for fire protection, environmental qualification, pressurized thermal shock, anticipated transients without scram, and station blackout. An applicant for a renewed license must review all SSCs within the scope of license renewal to identify those structures and components (SCs) subject to an AMR. SCs subject to an AMR are those that perform an intended function without moving parts or without a change in configuration or properties (passive), and that are not subject to replacement based on qualified life or specified time period (long-lived). Pursuant to 10 CFR 54.21(a)(3), an applicant for a renewed license must demonstrate that the effects of aging will be managed in such a way that the intended function or functions of those SCs will be maintained, consistent with the CLB, for the period of extended operation. 10 CFR 54.21(d) requires that the applicant submit a supplement to the final safety analysis report (FSAR) that contains a summary description of the programs and activities that it credited to manage the effects of aging during the extended period of operation.

The SRP-LR provides staff guidance for reviewing applications for license renewal. The GALL Report is a technical basis document. It summarizes staff-approved AMPs for the aging management of a large number of SCs that are subject to an AMR. It also summarizes the aging management evaluations, programs, and activities acceptable to the NRC staff for managing aging of most of the SCs used in commercial nuclear power plants, and serves as a reference for both the applicant and staff reviewers to quickly identify those AMPs and activities that the staff has determined will provide adequate aging management during the extended period of operation. If an applicant commits to implementing these staff-approved AMPs, the time, effort, and resources needed to review an applicant's LRA will be greatly reduced, thereby improving the efficiency and effectiveness of the license renewal review process. The GALL Report identifies (1) systems, structures, and components, (2) component materials, (3) the environments to which the components are exposed, (4) the aging effects associated with the materials and environments, (5) the AMPs that are credited to manage the aging effects, and (6) recommendations for further evaluations of aging effects and aging management for certain component types.

The GALL Report is treated in the same manner as an approved topical report that is generically applicable. An applicant may reference the GALL Report in its LRA to demonstrate that its programs correspond to those that the staff reviewed and approved in the GALL Report. If the material presented in the LRA is consistent with the GALL Report and is applicable to the applicant's facility, the staff will accept the applicant's reference to the GALL Report. In making this determination, the staff considers whether the applicant has identified specific programs described and evaluated in the GALL Report but does not conduct a re-review of the substance of the matters described in the GALL Report. Rather, the staff confirms that the applicant verified that the approvals set forth in the GALL Report apply to its programs.

If an applicant takes credit for a GALL Report AMP, it is incumbent on the applicant to ensure that the plant AMP contains all the program elements of the referenced GALL Report AMP. In addition, the conditions at the plant must be bounded by the conditions for which the GALL Report AMP was evaluated. The applicant must certify in its LRA that it completed the verifications and that they are documented on-site in an auditable form.

3. Objectives

The overall objective of the audit and review described in this plan is to verify compliance with 10 CFR 54.21(a)(3). Therefore, the audit and review process helps ensure that for each structure and component within the scope of the project team's review, the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation.

The audit and review procedure for OCGS is described in Sections 5 and 6 of this audit and review plan. It is intended to accomplish the following objectives:

- C For OCGS AMPs that the applicant claims are consistent with GALL Report AMPs, verify that the plant AMPs contain the program elements of the referenced GALL Report AMP and that the conditions at the plant are bounded by the conditions for which the GALL Report AMPs were evaluated.
- C For OCGS AMPs that the applicant claims are consistent with GALL Report AMPs with exceptions, verify that the plant AMPs contain the program elements of the referenced GALL Report AMPs and that the conditions at the plant are bounded by the conditions for which the GALL Report AMPs were evaluated. In addition, verify and evaluate whether the applicant has documented an acceptable technical basis for each exception.
- C For OCGS AMPs that the applicant claims will be consistent with GALL Report AMPs after specified enhancements are implemented, verify that the plant AMPs, with the enhancements, will be consistent with the referenced GALL Report AMPs, or are acceptable on the basis of a technical review. In addition, verify that the applicant identified the enhancements as commitments in the Updated Final Safety Analysis Report (UFSAR) or other docketed correspondence.
- C For plant-specific OCGS AMPs that the applicant claims are consistent with AMPs that the staff has previously approved for another plant, verify that these AMPs are acceptable on the basis of a technical review.

- C For AMR line items that the applicant claims are consistent with the GALL Report, verify that these OCGS AMR line items are consistent with the recommendation of the GALL Report.
- C For AMR line-items that the applicant claims are consistent with AMR line items that the staff has previously approved for another plant, verify that these AMR line-items are acceptable on the basis of a technical review.
- C For AMR line items for which the GALL Report recommends further evaluation, verify that the applicant has addressed the further evaluation, and evaluate the AMRs in accordance with the SRP-LR.

4. Summary of Information Provided in the License Renewal Application

The OCGS LRA closely follows the standard LRA format presented in NEI 95-10, "Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 – The License Renewal Rule." Section 3 of the OCGS LRA provides the results of the aging management review for structures and components that the applicant identified as being subject to aging management review.

OCGS LRA Table 3.0-1, Table 3.0-2, Table 3.0-3 and Table 3.0-4 provide descriptions of the internal service, external service, passive component and aging effects used in the AMRs to determine the aging effects requiring management. Results of the AMRs are presented in two different types of tables. The applicant refers to the two types of tables as Table 1 and Table 2.

The first table type is a series of six tables labeled Table 3.X.1, where "X" is the system/component group number (see table below), and "1" indicates it is a Table 1 type. For example, in reactor vessel, internals and reactor coolant system subsection of the OCGS LRA Section 3, this is Table 3.1.1, and in the engineered safety features subsection of OCGS LRA Section 3, this is Table 3.2.1.

X	Definition
1	Reactor Vessel, Internals and Reactor Coolant System
2	Engineered Safety Features
3	Auxiliary Systems
4	Steam and Power Conversion Systems
5	Containment, Structures, Component Supports and Piping Component Insulation
6	Electrical Components

The second table type is a series of tables labeled Table 3.X.2.1.Y, where "X" is the system/component group number, "2" indicates it is a Table 2 type, and "Y" indicates the subgroup number within group "X". For example, within the "reactor vessel, internals and reactor coolant system" (group 1), the AMR results for the isolation condenser system (subgroup 1) are presented in OCGS LRA Table 3.1.2.1.1, and the results for the nuclear boiler instrumentation (subgroup 2) are presented in OCGS LRA Table 3.1.2.1.2. Under the

“engineered safety features system” (group 2), the containment spray system (subgroup 1) results are presented in Table 3.2.2.1.1 of the OCGS LRA, and the core spray system is in Table 3.2.2.1.2 of the OCGS LRA.

The applicant compared the OCGS AMR results with information set forth in the tables of the GALL Report and provided the results of its comparisons in two table types that correlate with the two table types described above.

OCGS LRA Tables 3.1.1.1 through 3.6.1.1 (Table 1 types) provide a summary comparison of how the OCGS AMR results align with Tables 1 through 6 of the GALL Report, Volume 1. These OCGS LRA tables are essentially the same as Tables 1 through 6 of the GALL Report, Volume 1, except that the "Type" column has been replaced by an "Item Number" column, the GALL Volume 2 Item Number column has been deleted, and a "Discussion" column has been added. The "Item Number" column provides a means to cross-reference between OCGS LRA Table 3.X.2.1.Y (Table 2 type) and OCGS LRA Table 3.X.1.1 (Table 1 type). The “Discussion” column includes further information. The following are examples of information that might be contained within the “Discussion” column:

- "Further Evaluation Recommended" information or reference to where that information is located
- The name of a plant-specific program being used
- Exceptions to the GALL Report recommendations
- A discussion of how the line item is consistent with the corresponding line item in the GALL Report, when it may not be intuitively obvious
- A discussion of how the line item differs from the corresponding line item in the GALL Report, when it may appear to be consistent.

OCGS LRA Table 2 types provide the detailed results of the AMRs for those SCs that are subject to an aging management review. There is a Table 2 for each subgroup within the six system/component groups. For example, the engineered safety features system groups contains tables specific to containment spray, core spray system and standby gas treatment. Table 2 of the OCGS LRA consists of the following nine columns.

- *Component Type*. Column 1 identifies the component types that are subject to an AMR. The component types are listed in alphabetical order. In the structural tables, component types are sub-grouped by material.
- *Intended Function*. Column 2 identifies the license renewal intended functions for the listed component types. Definitions and abbreviations of intended functions are listed in Table 2.1-1 in Section 2 of the OCGS LRA.
- *Material*. Column 3 lists the particular materials of construction for the component type being evaluated.
- *Environment*. Column 4 lists the environment to which the component types are exposed. Internal and external service environments are indicated. A description of these environments is provided in OCGS LRA Table 3.0-1, Table 3.0-2 for internal service and external service respectively.

- *Aging Effect Requiring Management.* Column 5 lists the aging effects identified as requiring management for the material and environment combinations of each component type.
- *Aging Management Programs.* Column 6 lists the programs used to manage the aging effects requiring management.
- *GALL Report (Vol. 2) Item.* Each combination of the following factors listed in LRA Table 2 is compared to the GALL Report to identify consistencies: component type, material, environment, aging effect requiring management, and aging management program. Column 7 documents identified consistencies by noting the appropriate GALL Report item number. If there is no corresponding item number in the GALL Report for a particular combination of factors, column 7 is left blank.
- *LRA Table 1 Item.* Each combination of the following that has an identified GALL Report item number also has a Table 1 line item reference number: component type, material, environment, aging effect requiring management, and aging management program. Column 8 lists the corresponding line item from Table 1. If there is no corresponding item in the GALL Report (Volume 1), column 8 is left blank.
- *Notes.* Column 9 contains notes that are used to describe the degree of consistency with the line items in the GALL Report. Notes that use letter designations are standard notes based on the letter from A. Nelson, NEI, to P. T. Kuo, NRC, "U.S. Nuclear Industry's Proposed Standard License Renewal Application Format Package, Request NRC Concurrence," dated January 24, 2003 (ML030290201).¹ These standard notes are shown in Table 2 of this plan. Notes that use numeric designators are specific to OCGS.

OCGS LRA Table 2 contains the aging management review results and indicates whether the results correspond to line items in Volume 2 of the GALL Report. Correlations between the combination in OCGS LRA Table 2 and a combination for a line item in Volume 2 of the GALL Report are identified by the GALL Report item number in column 7. If column 7 is blank, the applicant did not identify a corresponding combination in the GALL Report. If the applicant identified a GALL Report line item, the next column provides a reference to a Table 1 row number. This reference corresponds to the GALL Report, Volume 2, "roll-up" to the GALL Report, Volume 1, tables. Many of the GALL Report evaluations refer to plant-specific programs. In these cases, the applicant considers the OCGS evaluation to be consistent with the GALL Report if the other program elements are consistent. Any appropriate OCGS AMP is considered to be a match to the GALL Report AMP for line items referring to a plant-specific program.

5. Overview of Audit, Review, and Documentation Procedure

The project team will follow the process specified in Section 6 of this audit and review plan to perform its audits and reviews and to document the results of its work. The process is summarized below.

¹ The staff concurred with the standardized format for license renewal applications by letter dated April 7, 2003, from P.T. Kuo, NRC, to A. Nelson, NEI (ML030990052).

5.1. Aging Management Programs

Table 1 of this audit and review plan summarizes the ten program elements that comprise an aging management program. For the OCGS AMPs for which the applicant claimed consistency with the AMPs included in the GALL Report, the project team will review the OCGS AMP descriptions and compare program elements for the OCGS AMPs to the corresponding program elements for the GALL Report AMPs. The project team will verify that the OCGS AMPs contain the program elements of the referenced GALL Report AMP and that the conditions at the plant are bounded by the conditions for which the GALL Report program was evaluated. In addition, for program elements 7, Corrective Actions, 8, Confirmation Process, and 9, Administrative Controls, the Division of Inspection Program will review and determine the adequacy of the applicant's 10 CFR 50, Appendix B Program. Other aspect of these program elements will be review by the project team.

For OCGS AMPs that have one or more exception and/or enhancement, the project team will review each exception and/or enhancement to determine whether the exception and/or enhancement is acceptable and whether the OCGS AMP, as modified by the exception and/or enhancement, would adequately manage the aging effects for which it is credited. In some cases, the project team will identify differences that the applicant did not identify between the OCGS AMPs credited by the applicant and the GALL Report AMPs. In these cases, the project team will review the difference to determine whether or not it is acceptable and whether or not the OCGS AMP, as modified by the difference, would adequately manage the aging effects.

5.2. Aging Management Reviews

The AMRs in the GALL Report fall into two broad categories: (1) those that the GALL Report concludes are adequate to manage aging of the components referenced in the GALL Report, and (2) those for which the GALL Report concludes that aging management is adequate, but further evaluation is recommended for certain aspects of the aging management process. For its AMR reviews, the project team will determine whether the AMRs reported by the applicant to be consistent with the GALL Report are indeed consistent with the GALL Report. For component groups evaluated in the GALL Report for which the applicant claimed consistency with the GALL Report, and for which the GALL Report recommends further evaluation, the project team will review the applicant's evaluation to determine if it adequately addressed the issues for which the GALL Report recommended further evaluation.

5.3. NRC-Approved Precedents

To help facilitate the project team staff review of its LRA, an applicant may reference NRC-approved precedents to demonstrate that its non-GALL programs correspond to reviews that the staff had approved for other plants during its review of previous applications for license renewal. When an applicant elects to provide precedent information, the project team will review and determine whether the material presented in the precedent is applicable to the applicant's facility, determine whether the plant program is bounded by the conditions for which the precedent was evaluated and approved, and determine that the plant program contains the program elements of the referenced precedent. In general, if the project team determines that these conditions are satisfied, it will use the information in the precedent to frame and focus its review of the applicant's program.

It is important to note that precedent information is not a part of the LRA; it is supplementary information voluntarily provided by the applicant as a reviewer's aid. The existence of a

precedent, in and of itself, is not a sufficient basis to accept the applicant's program. Rather, the precedent facilitates the review of the substance of the matters described in the applicant's program. As such, in its documentation of its reviews of programs that are based on precedents, the precedent information is typically implicit in the evaluation rather than explicit. If the project team determines that a precedent identified by the applicant is not applicable to the particular plant program for which it is credited, it may refer the program to the NRR DE for review in the traditional manner, i.e., as described in the SRP-LR, without consideration of the precedent information.

5.4. UFSAR Supplement Review

Consistent with the SRP-LR, for the AMRs and associated AMPs that it will review, the project team will review the UFSAR supplement that summarizes the applicant's programs and activities for managing the effects of aging for the extended period of operation. The project team will also review any commitments associated with its programs and activities made by the applicant and verify that they are acceptable for the stated purpose. In addition, the project team will verify that the applicant identified the enhancements as commitments in the Updated Final Safety Analysis Report (UFSAR) or other docketed correspondence.

5.5. Documents Reviewed by the Project Team

In performing its work, the project team will rely heavily on the OCGS LRA, the audit and review plan, the SRP-LR, and the GALL Report. The project team will also examine the applicant's precedent review documents, its AMP and AMR basis documents (catalogs of the documentation used by the applicant to develop or justify its AMPs and AMRs), and other applicant documents, including selected implementing procedures, to verify that the applicant's activities and programs will adequately manage the effects of aging on structures and components.

5.6. Public Exit Meeting

After it completes its audits and reviews, the project team will hold a public exit meeting to discuss the scope and results of its audits and reviews.

5.7. Documentation Prepared by the Project Team

The project team will prepare an audit and review plan, worksheets, work packages, requests for additional information (RAIs), an audit and review report, and a safety evaluation report (SER) input. The project team will also prepare questions prior to site visits and during site visits, and will track the applicant's responses to these questions.

5.7.1. Audit and Review Plan

The project team will prepare a plant-specific audit and review plan as described herein.

5.7.2. Worksheets

Each project team member will document the results of his or her work in worksheets. The worksheets are shown in Appendix E, “Consistent with GALL Report AMP Audit/Review Worksheet;” Appendix F, “Plant-Specific AMP Audit/Review Worksheet;” and Appendix G, “Aging Management Review Worksheets.” The use of the worksheets is described in Section 6 of this audit and review plan.

5.7.3. Questions

As specified in Section 6 of this audit and review plan, the project team will ask the applicant questions, prior to site visits and while on-site, as appropriate, to facilitate its audit and review activities. The project team will also track and review the applicant’s answers to these questions.

5.7.4. Work packages

During the audit and review process, the project team leader, in conjunction with the NRC license renewal project manager, will assemble work packages for any work that the project team will refer to the NRR Division of Engineering (DE) for review. Each work package will include a work request and any applicable background information on the review item that was gathered by the project team.

5.7.5. Request for additional information

The audit and review process described in this audit and review plan is structured to resolve as many questions as possible during the on-site visits. As examples, the on-site visits are used to obtain clarifications about the OCGS LRA and explanations as to where certain information may be found in the OCGS LRA or its associated documents. Nevertheless, there may be occasions where an RAI is appropriate to obtain information to support an SER finding. The need for RAIs will be determined by the project team leader through discussions with the individual project team members. When the project team leader determines that an RAI is needed, the project team member who is responsible for the area of review will prepare the RAI. RAIs will include the technical and regulatory basis for requesting the information.

After the project team receives a response to an RAI from the applicant, the project team leader will provide the response to the project team member who prepared the RAI. The project team member will review the response and determine if it resolves the issue described in the RAI. The project team member will document the disposition of the RAI in the audit and review report (unless the report was issued before the RAI response was received) and in the SER input. If the audit and review report was issued before the applicant submitted its response to an RAI, the project team’s evaluation of the response will be documented in the SER related to the OCGS LRA.

5.7.6. Audit and Review Report

The project team will document the results of its work in an audit and review report. The project team will prepare its report as described in Section 6.4.1 of this audit and review plan and the latest version of the *Writing Guide and Template for Preparing License Renewal Application Audit and Review Report*.

5.7.7. Safety Evaluation Report Input

The project team will prepare SER input, based on the audit and review report, as described in Section 6.4.2 of this plan.

6. Planning, Audit, Review, and Documentation Procedure

This section of the audit and review plan contains the detailed procedures that the project team will follow to plan, conduct, and document its audit and review work.

6.1. Planning Activities

6.1.1. Schedule for Key Milestones and Activities

The project team leader will establish the schedule for the key milestones and activities, consistent with the overall schedule for making the licensing renewal decision. Key milestones and activities include, as a minimum:

- A. receiving the LRA from the applicant
- B. receiving work split tables from the NRC license renewal project manager
- C. making individual work assignments
- D. training project team members
- E. holding the project team kickoff meeting
- F. preparing the audit and review plan
- G. scheduling on-site visits
- H. scheduling in-office review periods
- I. preparing questions
- J. preparing RAIs
- K. preparing draft and final audit and review report
- L. preparing draft and final SER input

On-site visits will be scheduled on the basis of discussions between the project team leader, the NRC license renewal project manager, and the applicant.

Appendix B of this plan contains the target schedule for the key milestones and activities.

6.1.2. Work Assignments

The NRC technical assistance contractor will provide proposed project team member work assignments to the project team leader. The project team leader will approve all work assignments. After the audit and review plan is issued, the project team leader may reassign work as necessary.

The NRC technical assistance contractor will develop assignment tables that show which project team member will review each of the OCGS AMPs and AMRs. Appendix A of this audit and review plan shows the project team membership. Appendix C shows the project team member assignments for the AMPs. Appendix D of this plan shows the project team member assignments for the AMRs.

6.1.3. Training and Preparation

The training and preparation, if applicable, will include the following:

- A. A description of the audit and review process.
- B. An overview of audit/review-related documentation and the documentation that the project team will audit and review.

- (1) GALL Report
- (2) SRP-LR
- (3) Interim Staff Guidance (ISG)
- (4) LRA AMPs
- (5) LRA AMRs
- (6) basis documents (catalogues of information assembled by the applicant to demonstrate the bases for its programs and activities)
- (7) implementing procedures
- (8) operating experience reports
- (9) RALs, audit and review reports, and SERs for other plants
- (10) applicant's UFSAR

- C. The protocol for interfacing with the applicant.
- D. Administrative issues such as travel, control of documentation, work hours, etc.
- E. Process for preparing questions, RALs, the audit and review report, and SER input.
- F. Process for interfacing with DE technical reviewers.

6.2. Aging Management Program Audits and Reviews

6.2.1. Types of AMPs

There are two types of AMPs: those that the applicant claims are consistent with AMPs contained in the GALL Report and those that are plant-specific. The process for auditing and reviewing both types of AMPs is presented in the following sections of this audit and review plan.

6.2.2. Scope of AMP Program Elements to be Audited And Reviewed

Table 1 of this plan shows the ten program elements that are used to evaluate the adequacy of each aging management program. These program elements are also presented in Branch Technical Position (BTP) RLSB-1, "Aging Management Review - Generic," in Appendix A of the SRP-LR, and are summarized in the GALL Report.

The program elements audited or reviewed is the same for both AMPs that are consistent with the GALL Report and for plant-specific AMPs. However, for program elements 7, Corrective Actions, 8, Confirmation Process, and 9, Administrative Controls, the Division of Inspection Program will review and determine the adequacy of the applicant's 10 CFR 50, Appendix B Program. Other aspect of these program elements will be review by the project team.

6.2.3. Plant AMPs that are Consistent with the GALL Report

Figure 1, "Audit of AMPs That Are Consistent with the GALL Report," is the process flowchart that shows the activities and decisions used by the project team to audit and review each plant AMP that the applicant claims is consistent with the GALL Report.

Preparation.

- A. For the OCGS AMP being reviewed, identify the corresponding GALL Report AMP.
- B. Review the associated GALL Report AMP.

C. Identify the documents needed to perform the audit. These may include, but are not limited to, the following:

- (1) GALL Report
- (2) SRP-LR
- (3) ISGs
- (4) RAIs, audit and review reports, and SERs for similar plants
- (5) LRA
- (6) basis documents
- (7) implementation procedures
- (8) operating experience reports (plant-specific and industry)
- (9) applicant's UFSAR

Audit/Review

A. Confirm that the OCGS AMP program elements are consistent with the corresponding elements of the GALL Report AMP by answering the following questions and then following the process shown in Figure 1.

- (1) Did the applicant identify any exceptions to the GALL Report AMP?
- (2) Are the program elements consistent with the GALL Report AMP?

B. If either of the above questions results in the identification of an exception or a difference to the GALL Report AMP, determine whether it is acceptable on the basis of an adequate technical justification.

C. If an acceptable basis exists for an exception or difference, document the basis in the worksheet and later in the audit and review report and the SER input.

D. Review the industry and plant-specific operating experience associated with the AMP. The review is to identify aging effects requiring management that are not identified by the industry guidance documents (such as EPRI tools) and to confirm the effectiveness of aging management programs. The project team members should consider the industry guidance when assessing operating experience and formulating questions for the applicant. The industry guidance (NEI 95-10) is as follows:

- (1) Plant-Specific Operating Experience with Aging Effects Requiring Management. The review should assess the operating and maintenance history. A review of the prior five to ten years of operating and maintenance history should be sufficient. The results of the review should confirm consistency with reported industry operating experience. Differences with previously reported industry experience, such as new aging effects or lack of aging effects, allow for consideration in the plant-specific aging management requirements.
- (2) Plant-Specific Operating Experience with Existing Aging Management Programs. The operating experience of aging management programs, including corrective actions resulting in program enhancements or additional programs, should be considered. The review should provide objective evidence to support the conclusion that the effects of aging will be managed so that the intended function(s) will be maintained during the extended period of operation. Guidance for reviewing industry

operating experience is presented in BTP RLSB-1 in Appendix A.1 of the Branch Technical Positions in NUREG-1800.

(3) Industry Operating Experience. Industry operating experience and its applicability should be assessed to determine whether it changes plant-specific determinations. NUREG-1801 is based upon industry operating experience prior to its date of issuance. Operating experience after the issuance date of NUREG-1801 should be evaluated and documented as part of the aging management review. In particular, generic communications such as a bulleting or an information notice should be evaluated for impact upon the AMP. The evaluation should check for new aging effects or a new component or location experiencing an already identified aging effect.

- E. If it is necessary to ask the applicant a question to clarify the basis for accepting the justification, an exception, or a difference to the program element of the GALL Report, follow the logic process shown in Figure 1.
- F. If it is necessary for the applicant to submit additional information to support the basis for accepting the justification, an exception, or a difference to a program element, the applicant may agree to voluntarily submit the required information as a supplement to the OCGS LRA. If not, the NRC may issue an RAI to obtain the information.

AMP audit worksheets

Document the audits/reviews using the worksheet provided in Appendix E, "Consistent with GALL Report AMP Audit/Review Worksheet."

6.2.4. Plant-Specific AMPs

Figure 2, "Audit of Plant-Specific AMPs," is the process flowchart that shows the activities and decisions used to audit/review each plant-specific AMP. Plant specific AMPs are not in the Project Team's review scope and are being reviewed by the Division of Engineering.

Pre-review preparation

- A. Review Section A.1.2.3 of the SRP-LR and identify those element criteria that will be reviewed.
- B. Identify the documents needed to perform the audit. These may include, but are not limited to, the following:
 - (1) GALL Report
 - (2) SRP-LR
 - (3) ISGs
 - (4) RAIs, audit and review reports, and SERs for similar plants
 - (5) LRA
 - (6) basis documents
 - (7) implementation procedures
 - (8) operating experience reports (plant-specific and industry)
 - (9) applicant's UFSAR

Audit/review

- A. Audit/review the OCGS AMP program elements and verify that they are consistent with the corresponding elements of Section A.1.2.3 of the SRP-LR.
- B. Review the industry and plant-specific operating experience associated with the AMP. This is an area of review emphasis. They require review to identify aging effects requiring management that are not identified by the industry guidance documents (such as EPRI tools) and to confirm the effectiveness of aging management programs. The project team members should consider the industry guidance when assessing operating experience and formulating questions for the applicant. The industry guidance (from NEI 95-10) is as follows:
 - (1) Plant-Specific Operating Experience with Aging Effects Requiring Management. The review should assess the operating and maintenance history. A review of the prior five to ten years of operating and maintenance history should be sufficient. The results of the review should confirm consistency with reported industry operating experience. Differences with previously reported industry experience, such as new aging effects or lack of aging effects, allow for consideration in the plant-specific aging management requirements.
 - (2) Plant-Specific Operating Experience with Existing Aging Management Programs. The operating experience of aging management programs, including corrective actions resulting in program enhancements or additional programs, should be considered. The review should provide objective evidence to support the conclusion that the effects of aging will be managed so that the intended function(s) will be maintained during the extended period of operation. Guidance for reviewing industry operating experience is presented in BTP RLSB-1 in Appendix A.1 of the Branch Technical Positions in NUREG-1800.
 - (3) Industry Operating Experience. Industry operating experience and its applicability should be assessed to determine whether it changes plant-specific determinations. NUREG-1801 is based upon industry operating experience prior to its date of issuance. Operating experience after the issuance date of NUREG-1801 should be evaluated and documented as part of the aging management review. In particular, generic communications such as a bulleting or an information notice should be evaluated for impact upon the AMP. The evaluation should check for new aging effects or a new component or location experiencing an already identified aging effect.
- E. If it is necessary to ask the applicant a question to clarify the basis for accepting the justification, an exception, or a difference to the program element of the GALL Report, follow the logic process shown in Figure 1.
- F. If it is necessary for the applicant to submit additional information to support the basis for accepting the justification, an exception, or a difference to a program element, the applicant may agree to voluntarily submit the required information as a supplement to the OCGS LRA. If not, the NRC may issue an RAI to obtain the information.

AMP review worksheets

Document the audit/review using the worksheet provided in Appendix F, “Plant-Specific AMP Audit/Review Worksheet.”

6.3. AMR Audits and Reviews

Audit and review of AMRs are discussed below. The project team will review AMRs that are consistent with the GALL Report. NRR/DE will review AMRs that are not consistent with or not addressed in the GALL Report.

6.3.1. Plant AMRs that are consistent with the GALL Report

Figure 3, “Review of AMRs That Are Consistent with the GALL Report,” is the process flowchart that shows the activities and decisions used to audit/review each AMR that the applicant claims is consistent with the GALL Report.

Preparation

- A. For the OCGS AMRs that the applicant claims are consistent with the GALL Report, identify the corresponding AMRs in Volume 2 of the GALL Report.
- B. Review the associated GALL Report AMRs and identify those line items that will be audited/reviewed in conjunction with each of the OCGS AMRs.
- C. Identify the documents needed to perform the review. These may include, but are not limited to, the following:
 - (1) GALL Report
 - (2) SRP-LR
 - (3) ISGs
 - (4) RAIs, audit and review reports, and SERs for similar plants
 - (5) LRA
 - (6) basis documents
 - (7) implementation procedures
 - (8) operating experience reports (plant-specific and industry)
 - (9) applicant’s UFSAR

Audit/review

- A. Each AMR line item is coded with a letter which represents a standard note designation.² The letter notes are described in Table 2 of this plan. Notes that use numeric designators are plant-specific. The note codes A through E are classified as “consistent with the GALL Report,” and will be reviewed in accordance with the guidance contained in this plan.
- B. The AMR review involves verification that the applicant has satisfied the requirements of 10 CFR 54.21(a)(3). This requirement states that, for “each structure and component

² The AMR line item letter notes are based on a letter from A. Nelson, NEI, to P. T. Kuo, NRC, “U.S. Nuclear Industry’s Proposed Standard License Renewal Application Format Package, Request NRC Concurrence,” dated January 24, 2003 (ML030290201). The staff concurred in the format of the standardized format for LRAs by letter dated April 7, 2003, from P.T. Kuo, NRC, to A. Nelson, NEI (ML030990052).

[within the scope of license renewal], demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the extended period of operation.”

- C. Verify compliance by following the process shown in Figure 3. The process is summarized below:
- (1) For each AMR line item, perform the review associated with the letter note (A through E) assigned to the AMR line item. Specifically, determine if the AMR is consistent with the GALL Report for the elements associated with its note
 - (2) If Note A applies, and the applicant uses a plant-specific AMP³, determine if the component is within the scope of the cited plant AMP. If the component is within the scope of the plant AMP, the AMR line item is acceptable. If not acceptable, go to Step (7) below.
 - (3) If Note B applies, review the LRA exceptions and document the basis for acceptance in the worksheet, and later in the audit and review report. If not acceptable, go to Step (7) below.
 - (4) If Note C or D applies, determine if the component type is acceptable for the material, environment, and aging effect. If Note D applies, also review the LRA exceptions and document the basis for acceptance in the worksheet, and later in the audit and review report. If not acceptable, go to Step (7) below.
 - (5) If Note E applies, review the AMP audit report findings to determine if the scope of the alternate AMP envelopes the AMR line item being reviewed and satisfies 10 CFR 54.21(a)(3). If it does not, go to Step (7) below.
 - (6) Review the corresponding LRA Table 3.X.1 entry that is referenced in LRA Table 3.X.2.1.Y. If applicable, determine whether the applicant’s “Further Evaluation Recommended” response in LRA Section 3.X.2.2.Z is enveloped by Section 3.X.2.2.Z of the SRP-LR. If not, go to Step (7) below. If the LRA section does not meet the acceptance criteria of Appendix A of the SRP-LR, go to Step (7) below.
 - (7) If during the review a difference is identified, prepare a question to the applicant, in order to obtain clarification.
 - (a) Review the applicant’s response to the question. If it appears acceptable, re-start the audit/review for the AMR line item from Step (1) above..
 - (b) If the applicant’s response does not resolve the question or issue, prepare an additional question to obtain the information needed to achieve resolution. Review the applicant’s response to the second question. If it appears acceptable, re-start the audit/review for the AMR line item from Step (1) above.
 - (c) If it is necessary for the applicant to submit additional information to resolve a question or an issue or to support a basis or conclusion, the applicant may

³ Some GALL AMRs reference the use of a plant-specific AMP. In such cases the AMR audit requires the project team member to confirm that the plant-specific AMP is appropriate to manage the aging effects during the period of extended operation.

submit the information as a supplement to the LRA or the NRC may issue an RAI to obtain the information. The team leader should be consulted if docketed information may be needed.

AMR audit/review worksheets

Document the audits/reviews of OCGS AMRs using the worksheet provided in Appendix G, "Aging Management Review Worksheets." As an alternate, the project team reviewer may document its review electronically in the AMR spreadsheets.

6.3.2. AMRs based on NRC-approved precedents

Figure 4, "AMR Review Using NRC-Approved Precedent," is the process flowchart that shows the activities and decisions used to review OCGS AMRs that the applicant has identified as being consistent with an NRC-approved precedent.⁴ There are no AMRs based on NRC approved precedents in the Project Team's scope.

Preparation

Identify the documents needed to perform the audit/review. These may include, but are not limited to, the following:

- (1) GALL Report
- (2) SRP-LR
- (3) ISGs
- (4) RAIs and SERs for similar plants
- (5) LRA
- (6) basis documents
- (7) implementation procedures
- (8) operating experience reports (plant-specific and industry)
- (9) applicant's UFSAR

Audit/review

- A. The AMR audit/review involves verification that the requirements of 10 CFR 54.21(a)(3) are satisfied. This criterion states that, "For each structure and component [within the scope of license renewal], demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation."
- B. For AMRs with an NRC-approved precedent, this may be achieved by answering the following questions while following the assessment process shown in Figure 4.
 - (1) Is the precedent appropriate for the OCGS AMR being reviewed?
 - (2) Is the NRC-approved precedent sufficiently documented or understood to technically support the adequacy of the OCGS AMR being reviewed?
 - (3) Is the OCGS AMR within the bounds of the chosen NRC-approved precedent?

⁴ Applicant identified NRC-approved precedents are only to be used as an aid for performing AMR audits. The audit conclusions will be based on the technical basis of the AMR and its applicability to the plant being reviewed. It is not acceptable to simply cite the NRC-approved precedent as its basis.

- (4) If any of these questions results in a 'No' answer, then additional information is required to make a determination that the AMR is acceptable.
- (5) If it is necessary to ask the applicant a question to obtain clarification on the basis for accepting the OCGS AMR, the process shown in Figure 4 should be used.
- (6) If it is necessary for the applicant's response to be docketed as a basis for accepting the exception or difference, the applicant may voluntarily docket the response or the NRC may issue an RAI.

AMR audit/review worksheets

Document the audits/reviews using the worksheet provided in Appendix G, "Aging Management Review Worksheets." As an alternate, the project team member may document its review electronically in the AMR spreadsheets.

6.4. Audit and Safety Review Documentation

As noted in Section 5.7 of this audit and review plan, the project team will prepare an audit and review plan, worksheets, work packages, requests for additional information, an audit and review report, and a SER input. This section of the audit and review plan addresses the preparation of the audit and review report and the SER input.

6.4.1. Audit and Review Report

Details on documentation of the audit and review report can be found in the latest version of the *Writing Guide and Template for Preparing License Renewal Application Audit and Review Report*.

In general, the audit and review report should include the following:

- A. Cover page
- B. Table of Contents
- C. Section 1.0, Introduction and General Information
 - Section 1.1, Introduction
 - Section 1.2, Background
 - Section 1.3, Summary of Information in the License Renewal Application
 - Section 1.4, Audit and Review Scope
 - Section 1.5, Audit and Review Process
 - Section 1.6, Exit Meeting
- D. Section 2.0, Aging Management Programs Audit and Review Results
- E. Section 3.0, Aging Management Review Audit and Review Results
- F. Attachments
 - Attachment 1, Abbreviations and Acronyms
 - Attachment 2, Project Team and Applicant Personnel
 - Attachment 3, Elements of an Aging Management Program for License Renewal
 - Attachment 4, Disposition of Requests for Additional Information, LRA
 - Supplements, and Open Items
 - Attachment 5, List of Documents Reviewed
 - Attachment 6, List of Commitments

6.4.2. Safety Evaluation Report Input

1. General guidance

- A. The project team will prepare the SER input for the AMP and AMR audits and reviews. The NRC technical assistance contractor shall collect, assemble, and prepare the complete SER input.
- B. In general, the data and information needed to prepare the SER input should be available in the project team's audit and review report and the project team member's worksheets.
- C. SER inputs are to be prepared for:
 - (1) each OCGS AMP that was determined to be consistent with the GALL Report, which has no exceptions or enhancements.
 - (2) each OCGS AMP that was determined to be consistent with the GALL Report, which has exceptions (identified by either the applicant or the project team) or enhancements.
 - (3) each plant-specific AMP
 - (4) AMRs that are consistent with the GALL Report
 - (5) project team AMR review results⁵
- D. The SER input should contain the following sections. (Note: The following section numbers (3. through 3.X.3) are based on the numbering system for the SER input. They are not a continuation of the numbering convention used throughout this plan.)

3. Aging Management Review Results

3.0 Applicant's Use of the Generic Aging Lessons Learned Report

3.0.1 Format of the LRA

3.0.2 Staff's Review Process

3.0.2.1 AMRs in the GALL Report

3.0.2.2 NRC-Approved Precedents

3.0.2.3 UFSAR Supplement

3.0.2.4 Documentation and Documents Reviewed

3.0.3 Aging Management Programs

3.0.3.1 AMPs that are Consistent With the GALL Report

3.0.3.2 AMPs that are Consistent With GALL Report With Exceptions or Enhancements

3.0.3.3 AMPs that are Plant-Specific

3.0.4 Quality Assurance Program Attributes Integral to Aging Management Programs

3.X.⁶ Aging Management of _____

3.X.1. Summary of Technical Information in the Application

3.X.2. Staff Evaluation

⁵ AMRs that are not consistent with the GALL Report.

⁶ The LRA AMR results are broken down into six sections and address the following system/structure groups: (1) Section 3.1, reactor vessel, internals and reactor coolant system, (2) Section 3.2, engineering safety features, (3) Section 3.3, auxiliary systems, (4) Section 3.4, steam and power conversion systems, (5) Section 3.5, containment, structures, component supports and piping and component insulation, (6) Section 3.6, electrical components.

- 3.X.2.1. Aging Management Review Results that are Consistent with the GALL Report
- 3.X.2.2. Aging Management Review Results For Which Further Evaluation is Recommended by the GALL Report
- 3.X.2.3. Aging Management Review Results that are Not Consistent with or Not Addressed in the GALL Report
- 3.X.3 Conclusion

- E. For each AMP audited/reviewed by the project team, the SER input shall include a discussion of the project team's review of the operating experience program element.
- F. If the applicant submitted a supplement to its LRA that is associated with the project team's audit or review activities, document the submittal (include the date and ADAMS Accession Number) and explain the issue that the submittal resolved and discuss the basis for the resolution.
- G. If an RAI was issued, identify the RAI number and briefly discuss the RAI. State if the RAI remains open or if the applicant response has been received and accepted. If the response was acceptable, identify the submittal (including the date and the ADAMS accession number) that provided the response and document the basis for its acceptance.
- H. Issues (e.g., RAIs) that have not been resolved by the applicant at the time the SER input is prepared should be identified as open items.

2. SER input

- A. For OCGS AMPs determined to be consistent with the GALL Report, without exceptions, include the AMP title, the plant AMP paragraph number, and a discussion of the basis for concluding that the UFSAR update (Appendix A of the OCGS LRA) is acceptable. This SER input documents that the AMP is consistent with the GALL Report.
- B. For OCGS AMPs determined to be consistent with the GALL Report, with exceptions or enhancement, the SER input should include a statement that the audit found the OCGS AMP consistent with the GALL Report and that any applicant-identified exceptions to the GALL Report were found technically acceptable to manage the aging effect during the period of extended operation. The SER input should identify the exceptions and provide the basis for acceptance. The SER input will also address the UFSAR supplement, and document the basis for concluding that it is acceptable.
- C. For plant-specific AMPs, the SER input should document the basis for accepting each of the seven elements reviewed by the project team. The SER input should also include a discussion concerning the adequacy of the UFSAR supplement.
- D. For aging management evaluations that are consistent with the GALL Report,⁷ the SER input should include the following:

⁷ The audit results documented in this section address the AMRs consistent with the GALL Report for which no further evaluation is recommended.

- (1) Identify the OCGS LRA section reviewed
 - (2) A summary of the type of information provided in the section of the OCGS LRA reviewed, including a listing of the OCGS AMPs reviewed.
 - (3) Identify the OCGS LRA Tables 3.X.2.1.Y reviewed.
 - (4) A summary review of the AMR Notes A through E used to classify the AMR line items used in these tables.
 - (5) A brief summary of what the staff (project team) reviewed to perform the audit, i.e., LRA and applicant basis documents and other implementation documents. Reference the appendix that lists the details of the documents reviewed.
 - (6) The bases for accepting any exceptions to GALL Report AMRs that were identified by the applicant or the project team member.
 - (7) A finding that verifies that:
 - (a) the applicant identified the applicable aging effects
 - (b) the applicant defined the appropriate combination of materials and environments
 - (c) the applicant specified acceptable AMPs
 - (8) A conclusion stating, if applicable, that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, and that 10 CFR 54.21(a)(3) has been satisfied.
- E. For aging management evaluations that are consistent with the GALL Report, for which further evaluation is recommended, the SER input should include the following:
- (1) The OCGS LRA section containing the applicant's further evaluations of AMRs for which further evaluation is required.
 - (2) A list of the aging effects for which the further evaluation apply.
 - (3) For the applicant's further evaluations, provide a summary of the basis for concluding that it satisfied the criteria of Section 3.1.3.2 of the SRP-LR.
 - (4) A statement that the staff audited the applicant's further evaluations against the criteria contained in Section 3.1.3.2 of the SRP-LR.
 - (5) A statement that the audit and review report contains additional information. Also identify the issue date and the ADAMS accession number for the audit and review report.
- F. Staff AMR Review Results.⁸ This section of the SER input documents the reviews of AMRs assigned to the project team that are not consistent with the GALL Report. The audit report should document the following, based on a precedent identified by the applicant:
- (1) The OCGS LRA section reviewed
 - (2) A summary of the type of information provided in the section of the LRA, reviewed, including a listing of the AMPs reviewed for this LRA section.
 - (3) Identify the OCGS LRA Tables 3.X.2.1.Y documented by this audit writeup.
 - (4) A brief summary of what the staff (project team) reviewed, i.e., LRA and applicant basis documents and other implementation documents.

⁸ This section documents reviews of AMRs assigned to the project team that are not consistent with the GALL Report.

- (5) A finding that verifies, if true, that:
 - (a) The applicant identified the applicable aging effects
 - (b) The applicant listed the appropriate combination of materials and environments
 - (c) The applicant specified acceptable AMPs
- (6) Provide a conclusion stating, if applicable, that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, and that 10 CFR 54.21(a)(3) has been satisfied.

6.5 Documents Reviewed and Document Retention

Any documents reviewed that were used to formulate the basis for resolution of an issue, such as the basis for a technical resolution, the basis for the acceptance of an exception or an enhancement, etc., should be documented as a reference in the audit and review report.

Upon issuance of the audit and review report, all worksheets that were completed by contractor and NRC personnel shall be given to the project team leader.

After the NRC has made its licensing decision, all copies of documents collected and all documents generated to complete the audit and review report, such as audit worksheets, question and answer tracking documentation, etc., are to be discarded.

Table 1. Aging Management Program Element Descriptions

Element		Description
1	Scope of the program	The scope of the program should include the specific structures and components subject to an aging management review.
2	Preventive actions	Preventive actions should mitigate or prevent the applicable aging effects.
3	Parameters monitored or inspected	Parameters monitored or inspected should be linked to the effects of aging on the intended functions of the particular structure and component.
4	Detection of aging effects	Detection of aging effects should occur before there is loss of any structure and component intended function. This includes aspects such as method or technique (i.e., visual, volumetric, surface inspection), frequency, sample size, data collection and timing of new/one-time inspections to ensure timely detection of aging effects.
5	Monitoring and trending	Monitoring and trending should provide prediction of the extent of the effects of aging and timely corrective or mitigative actions.
6	Acceptance criteria	Acceptance criteria, against which the need for corrective action will be evaluated, should ensure that the particular structure and component intended functions are maintained under all current licensing basis design conditions during the period of extended operation.
7*	Corrective actions	Corrective actions, including root cause determination and prevention of recurrence, should be timely.
8*	Confirmation process	The confirmation process should ensure that preventive actions are adequate and appropriate corrective actions have been completed and are effective.
9*	Administrative controls	Administrative controls should provide a formal review and approval process.
10	Operating experience	Operating experience involving the aging management program, including past corrective actions resulting in program enhancements or additional programs, should provide objective evidence to support a determination that the effects of aging will be adequately managed so that the structure and component intended functions will be maintained during the period of extended operation.

* Division of Inspection Program will review and determine the adequacy of the applicant's 10 CFR 50, Appendix B Program.

Table 2. Notes for License Renewal Application Tables 3.X.2-Y⁹

Note	Description
A	Consistent with NUREG-1801 [GALL Report] item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.
B	Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.
C	Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.
D	Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.
E	Consistent with NUREG-1801 for material, environment, and aging effect, but a different aging management program is credited.
F	Material not in NUREG-1801 for this component.
G	Environment not in NUREG-1801 for this component and material.
H	Aging effect not in NUREG-1801 for this component, material and environment combination.
I	Aging effect in NUREG-1801 for this component, material and environment combination is not applicable.
J	Neither the component nor the material and environment combination is evaluated in NUREG-1801.

⁹ Each AMR line item is coded with a letter which represents a standard note designation based on a letter from A. Nelson, NEI, to P.T. Kuo, NRC, "U.S. Nuclear Industry's Proposed Standard License Renewal Application Format Package, Request NRC Concurrence," dated January 24, 2003 (ML030290201). The staff concurred in the format of the standardized format for license renewal applications by letter dated April 7, 2003, from P.T. Kuo, NRC, to A. Nelson, NEI (ML030990052).

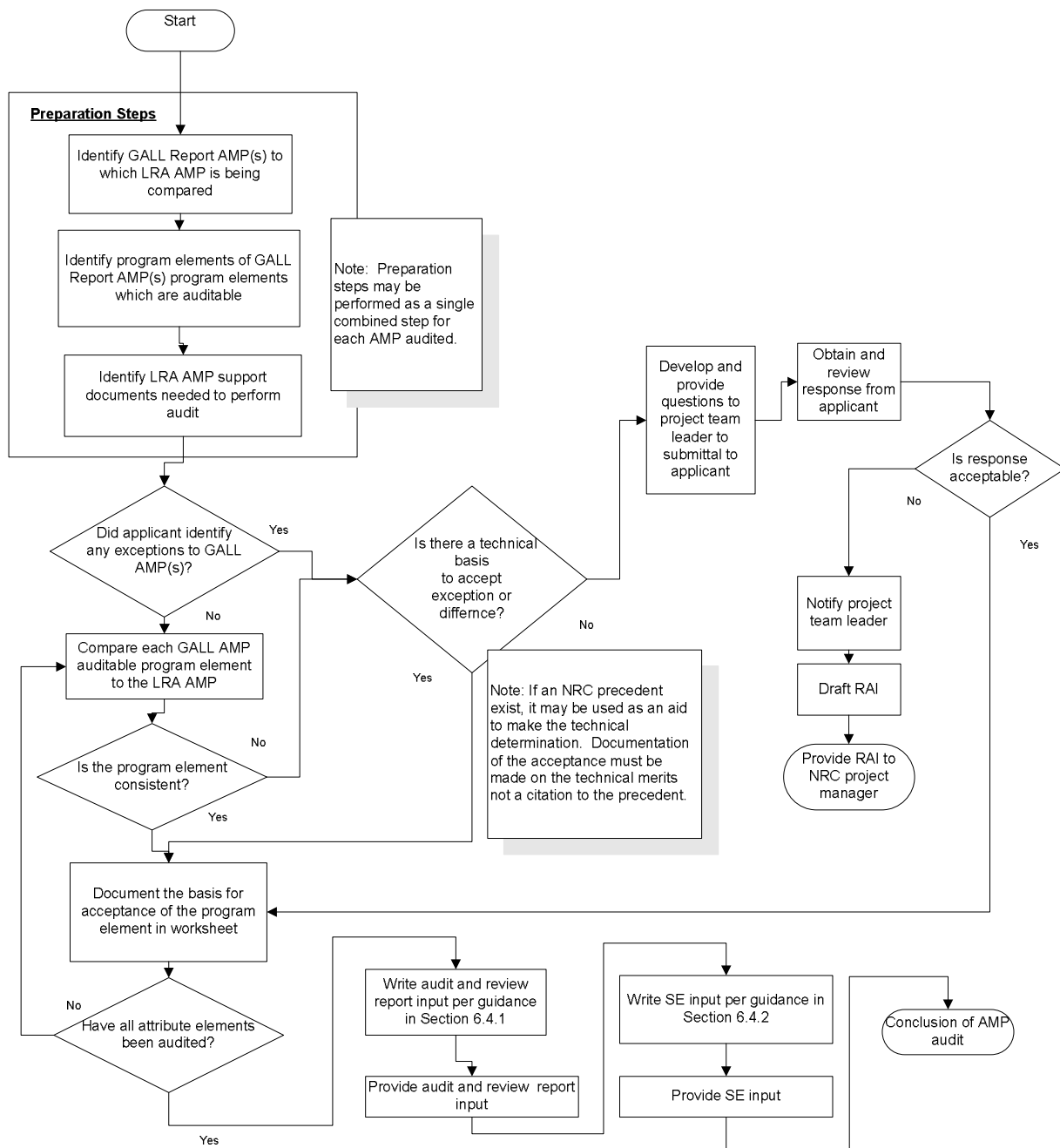


Figure 1. Audit of AMPs That Are Consistent With the GALL Report

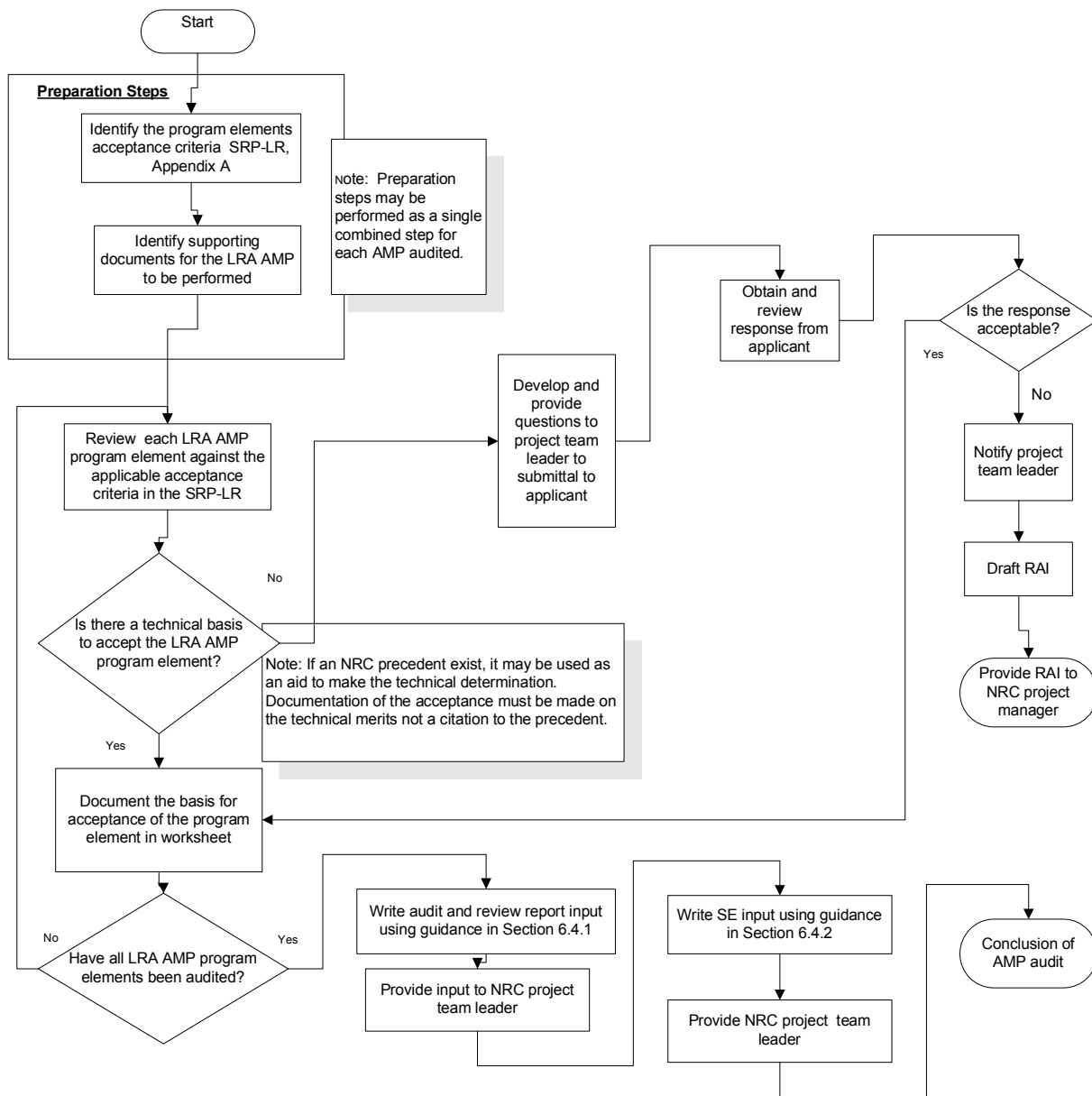


Figure 2. Audit of Plant-Specific AMPs

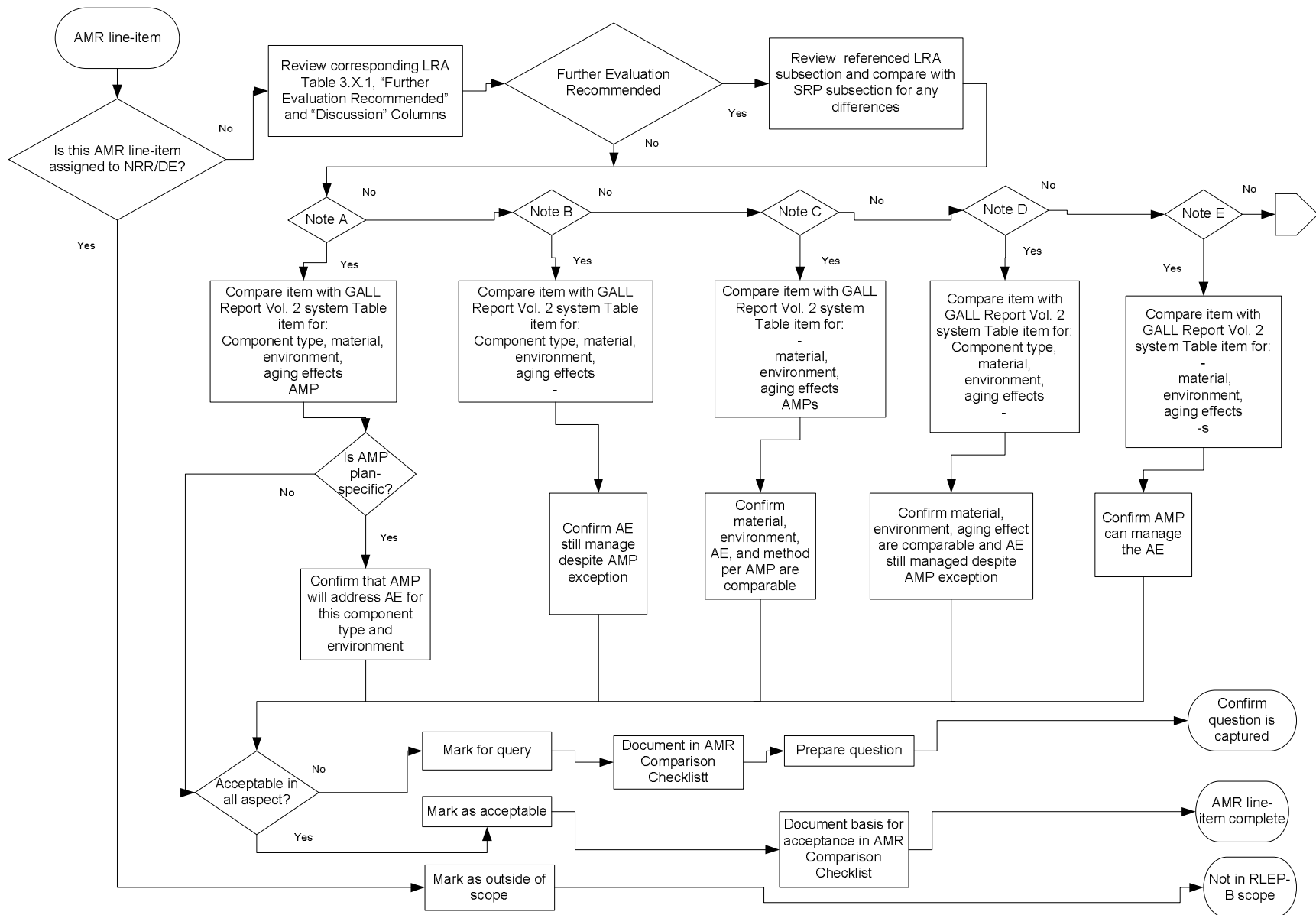


Figure 3. Review of AMRs That Are Consistent With the GALL Report

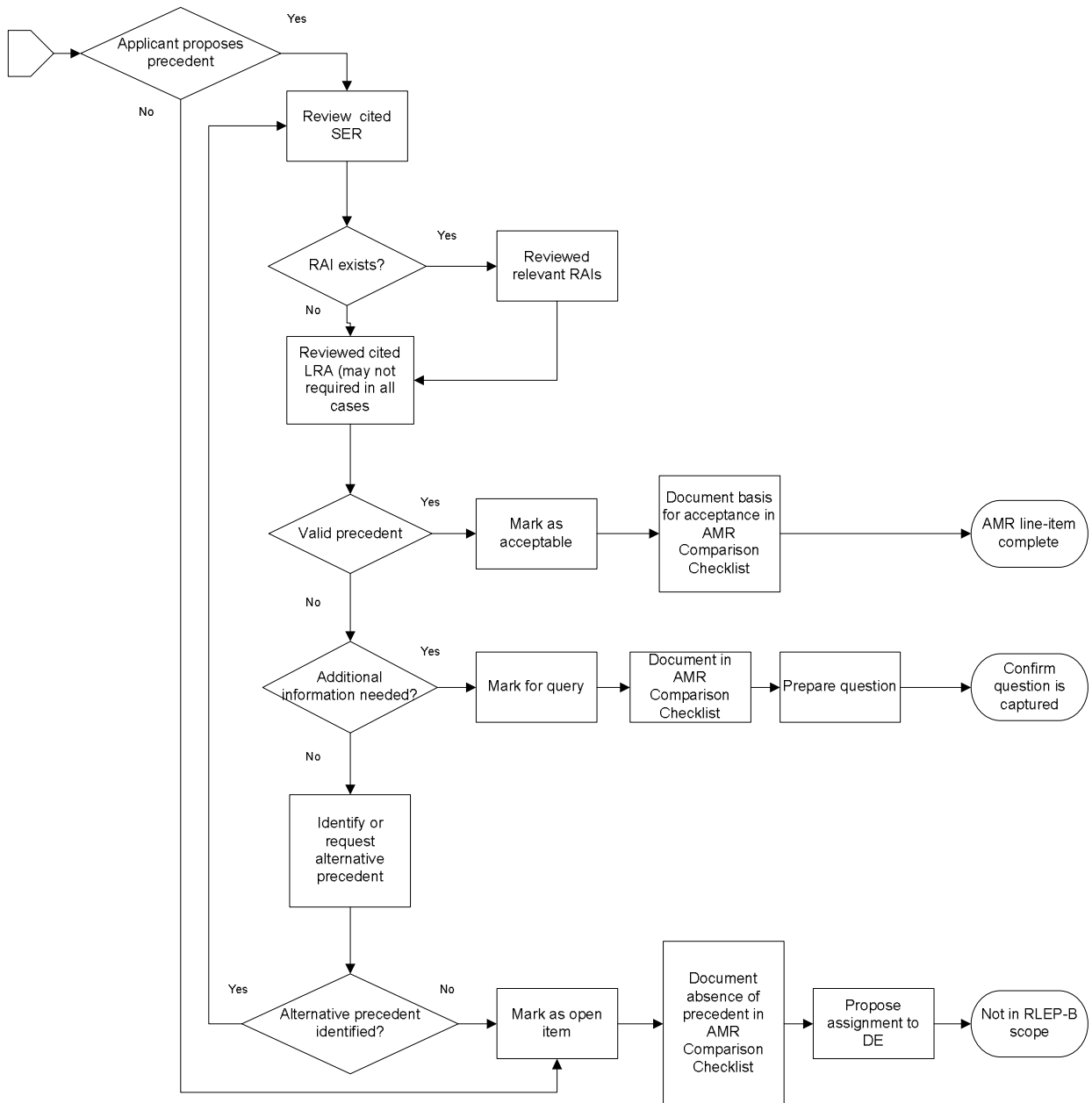


Figure 4. Review of AMRs Using NRC-Approved Precedents

Appendix A

Project Team Members

Appendix A

Project Team Members

Organization	Name	Function
NRC/NRR/DRIP/RLEP-B	G. Cranston	Project Team Leader
NRC/NRR/DRIP/RLEP-B	L. Tran	Backup team Leader Reviewer – Electrical
NRC/NRR/DRIP/RLEP-B	R. Hsu	Reviewer – Materials
NRC/NRR/DRIP/RLEP-B	W. Wang	Reviewer – Mechanical
BNL	R. Morante	Contractor Lead Reviewer – Structural, Materials
BNL	B. Lofaro	Reviewer - Mechanical
BNL	M. Subudhi	Reviewer – Mechanical, Materials
BNL	K. Sullivan	Reviewer – Systems (AMP)
BNL	M. Villaran	Reviewer – Systems (AMR)

Appendix B

RLEP-B Schedule for LRA Safety Review

RLEP- B Schedule for LRA Safety Review

ACTIVITY/MILESTONE		PLAN SCHEDULE
1	Receive LRA	07/22/2005
2	Complete Sufficiency Review	08/22
3	Make Review Assignments (RLEP-A PM)	08/22
4	Conduct Team Planning Meeting	09/07
5	Issue Audit Plan to PM	09/26
6	Conduct Site Visit 1 (AMP audit & review)	10/03 - 07
7	Draft AMP Audit Report Input	10/27
8	Conduct in-office AMR reviews	11/03
9	Site Visit 2 (AMR audit & review)	11/14 - 18
10	Draft AMR Audit Report Input	12/12
11	Optional Site Visit 3 (resolve AMR and AMP questions)	12/12
12	Public Exit Meeting	12/15
13	Cutoff for providing RAIs to PM	12/12
14	Peer Review of Final Draft Audit & Review Report	01/20/2006
15	Issue Final Audit & Review Report	01/25
16	Draft SER input (AMPs/AMRs)	02/11
17	Issue Final Draft SER Input to PM	02/17
18	ACRS Subcommittee Meeting	Oct. 2006
19	ACRS Full Committee Meeting	Feb. 2007

Appendix C

Aging Management Program Assignments

Appendix C

Aging Management Program Assignments

The following OCGS AMPs have been assigned to the project team for review.

GALL AMP	NUREG-1801 PROGRAM	OYSTER CREEK PROGRAM	ASSIGNMENTS
XI.M1	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.1.1)	Project Team (Bob Lofaro, BNL)
XI.M2	Water Chemistry	Water Chemistry (B.1.2)	Project Team (Mano Subudhi, BNL)
XI.M3	Reactor Head Closure Studs	Reactor Head Closure Studs (B.1.3)	Project Team (Robert Hsu, NRC)
XI.M4	BWR Vessel ID Attachment Welds	BWR Vessel ID Attachment Welds (B.1.4)	Project Team (Robert Hsu, NRC)
XI.M5	BWR Feedwater Nozzle	BWR Feedwater Nozzle (B.1.5)	Project Team (Mano Subudhi, BNL)
XI.M6	BWR Control Rod Drive Return Line Nozzle	BWR Control Rod Drive Return Line Nozzle (B.1.6)	Project Team (Mano Subudhi, BNL)
XI.M7	BWR Stress Corrosion Cracking	BWR Stress Corrosion Cracking (B.1.7)	Project Team (Mano Subudhi, BNL)
XI.M8	BWR Penetrations	BWR Penetrations (B.1.8)	Project Team (Mano Subudhi, BNL)
XI.M13	Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS)	Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) (B.1.10)	Project Team (Robert Hsu, NRC)
XI.M17	Flow-Accelerated Corrosion	Flow-Accelerated Corrosion (B.1.11)	Project Team (Weidong Wang, NRC)
XI.M20	Open-Cycle Cooling Water System	Open-Cycle Cooling Water System (B.1.13)	Project Team (Ken Sullivan, BNL)

GALL AMP	NUREG-1801 PROGRAM	OYSTER CREEK PROGRAM	ASSIGNMENTS
XI.M21	Closed-Cycle Cooling Water System	Closed-Cycle Cooling Water System (B.1.14)	Project Team (Ken Sullivan, BNL)
XI.M22	Boraflex Monitoring	Boraflex Rack Management Program (B.1.15)	Project Team (Weidong Wang, NRC)
XI.M23	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B.1.16)	Project Team (Bob Lofaro, BNL)
XI.M24	Compressed Air Monitoring	Compressed Air Monitoring (B.1.17)	Project Team (Ken Sullivan, BNL)
XI.M25	BWR Reactor Water Cleanup System	BWR Reactor Water Cleanup System (B.1.18)	Project Team (Bob Lofaro, BNL)
XI.M26	Fire Protection	Fire Protection (B.1.19)	Project Team (Ken Sullivan, BNL)
XI.M27	Fire Water System	Fire Water System (B.1.20)	Project Team (Ken Sullivan, BNL)
XI.M29	Aboveground Carbon Steel Tanks	Aboveground Outdoor Tanks (B.1.21)	Project Team (Weidong Wang, NRC)
XI.M30	Fuel Oil Chemistry	Fuel Oil Chemistry (B.1.22)	Project Team (Bob Lofaro, BNL) (Linh Tran, NRC)
XI.M32	One-Time Inspection	One-Time Inspection (B.1.24)	Project Team (Bob Lofaro, BNL)
XI.M33	Selective Leaching of Materials	Selective Leaching of Materials (B.1.25)	Project Team (Weidong Wang, NRC)
XI.M34	Buried Piping and Tanks Inspection	Buried Piping Inspection (B.1.26)	Project Team (Weidong Wang, NRC)

GALL AMP	NUREG-1801 PROGRAM	OYSTER CREEK PROGRAM	ASSIGNMENTS
XI.S1	ASME Section XI, Subsection IWE	ASME Section XI, Subsection IWE (B.1.27)	Project Team (Rich Morante, BNL)
XI.S3	ASME Section XI, Subsection IWF	ASME Section XI, Subsection IWF (B.1.28)	Project Team (Rich Morante, BNL)
XI.S4	10 CFR Part 50, Appendix J	10 CFR Part 50, Appendix J (B.1.29)	Project Team (Rich Morante, BNL)
XI.S5	Masonry Wall Program	Masonry Wall Program (B.1.30)	Project Team (Rich Morante, BNL)
XI.S6	Structures Monitoring Program	Structures Monitoring Program (B.1.31)	Project Team (Rich Morante, BNL) (Mano Subudhi, BNL)
XI.S7	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants	RG 1.127, Inspection of Water-Control Structures Associated With Nuclear Power Plants (B.1.32)	Project Team (Rich Morante, BNL)
XI.S8	Protective Coating Monitoring and Maintenance Program	Protective Coating Monitoring and Maintenance Program (B.1.33)	Project Team (Rich Morante, BNL) (corrosion mitigation) Weidong Wang (debris control)
XI.E1	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements (B.1.34)	Project Team (Linh Tran, NRC)
XI.E2	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits (B.1.35)	Project Team (Linh Tran, NRC)

GALL AMP	NUREG-1801 PROGRAM	OYSTER CREEK PROGRAM	ASSIGNMENTS
XI.E3	Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements (B.1.36)	Project Team (Linh Tran, NRC)
X.M1	Metal Fatigue of Reactor Coolant Pressure Boundary	Metal Fatigue of Reactor Coolant Pressure Boundary (B.3.1)	Project Team (Robert Hsu, NRC)
X.E1	Environmental Qualification (EQ) of Electrical Components	Environmental Qualification (EQ) Program (B.3.2)	Project Team (Linh Tran, NRC)

Appendix D

Aging Management Review Assignments

Appendix D

Aging Management Review Assignments

Aging Management Reviews	Reviewer
3.1 Aging Management of Reactor Vessel, Internals, and Reactor Coolant System	Subudhi, BNL Hsu - NRC
3.2 Aging Management of Engineered Safety Features	Subudhi, BNL Hsu – NRC Wang - NRC
3.3 Aging Management of Auxiliary Systems	Lofaro, BNL Villaran, BNL Wang - NRC
3.4 Aging Management of Steam and Power Conversion Systems	Lofaro, BNL Villaran, BNL Wang - NRC
3.5 Aging Management of Containment, Structures, Component Supports, and Piping/Component Insulation	Morante, BNL
3.6 Aging Management of Electrical Components	Tran, NRC

NOTE: The specific OCGS AMRs to be reviewed by the project team include all AMRs in LRA Sections 3.1 through 3.6 with Notes A, B, C, D, or E identified in the “Notes” column.

Appendix E

Consistent with GALL Report AMP Audit/Review Worksheets

Appendix E

Consistent with GALL Report AMP Audit/Review Worksheet

The worksheets provided in this appendix provide, as an aid for the reviewer, a process for documenting the basis for the assessment of the program elements contained in the GALL Report AMPs (Chapter XI of NUREG-1801, Volume 2). The worksheets provide a systematic method for recording the basis for assessments or to identify when the applicant needs to provide clarification or additional information. Information recorded in the worksheets will also be used to prepare the audit and review report and the safety evaluation report input.

The following AMP worksheets are applicable to the Oyster Creek LRA audit and review.

AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

REVIEWER: _____

DATE: _____

GALL AMP: X.E1 Environmental Qualification (EQ) of Electric Components

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The 10 CFR 50.49 defines the scope of components to be included requires the preparation and maintenance of a list of in-scope components	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Requires the preparation and maintenance of a qualification file that includes component performance specifications, electrical characteristics, and the environmental conditions to which the components could be subjected	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C The 10 CFR 50.49(e)(5) contains provisions for aging that require, in part, consideration of all significant types of aging degradation that can affect component functional capability	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
“	D The 10 CFR 50.49(e) also requires replacement or refurbishment of components not qualified for the current license term prior to the end of designated life, unless additional life is established through ongoing qualification	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment

“	<p>E The 10 CFR 50.49(k) and (l) permit different qualification criteria to apply based on plant and component vintage. Supplemental EQ regulatory guidance for compliance with these different qualification criteria is provided in the DOR Guidelines, Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors; NUREG-0588, Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment; and Regulatory Guide 1.89, Rev. 1, Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment</p>
“	<p>F Important attributes for the reanalysis of an aging evaluation include analytical methods, data collection and reduction methods, underlying assumptions, acceptance criteria, and corrective actions (if acceptance criteria are not met).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment</p>
“	<p>G Generic Safety Issue (GSI) 168, which is related to low-voltage EQ instrumentation and control cables, is currently an open generic issue. NRC research is ongoing to provide information to resolve it. An applicant is to address GSI-168 in its application for staff review.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment</p>
EQ Component Reanalysis Attributes	<p>A Reanalysis of an aging evaluation to extend the qualification of a component is performed on a routine basis pursuant to 10 CFR 50.49(e) as part of an EQ program.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment</p>
“	<p>B The analytical models used in the reanalysis of an aging evaluation are the same as those previously applied during the prior evaluation.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	C For license renewal, one acceptable method of establishing the 60-year normal radiation dose is to multiply the 40-year normal radiation dose by 1.5 (that is, 60 years/40 years). The result is added to the accident radiation dose to obtain the total integrated dose for the component.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
“	D Temperature data used in an aging evaluation is to be conservative and based on plant design temperatures or on actual plant temperature data.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
“	E plant temperature data can be obtained in several ways, including monitors used for technical specification compliance, other installed monitors, measurements made by plant operators during rounds, and temperature sensors on large motors (while the motor is not running).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
“	F A representative number of temperature measurements are conservatively evaluated to establish the temperatures used in an aging evaluation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
“	G Plant temperature data may be used in an aging evaluation in different ways, such as (a) directly applying the plant temperature data in the evaluation, or (b) using the plant temperature data to demonstrate conservatism when using plant design temperatures for an evaluation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
“	H Any changes to material activation energy values as part of a reanalysis are to be justified on a plant-specific basis.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment

“	I Similar methods of reducing excess conservatism in the component service conditions used in prior aging evaluations can be used for radiation and cyclical aging.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
“	J When unexpected adverse conditions are identified during operational or maintenance activities that affect the normal operating environment of a qualified component, the affected EQ component is evaluated and appropriate corrective actions are taken, which may include changes to the qualification bases and conclusions.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
“	K If the qualification cannot be extended by reanalysis, the component is to be refurbished, replaced, or requalified prior to exceeding the period for which the current qualification remains valid. A reanalysis is to be performed in a timely manner (that is, sufficient time is available to refurbish, replace, or requalify the component if the reanalysis is unsuccessful).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
1. Scope of Program	A EQ programs apply to certain electrical components that are important to safety and could be exposed to harsh environment accident conditions, as defined in 10 CFR 50.49 and Regulatory Guide 1.89, Rev.1.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
2. Preventive Actions:	A The 10 CFR 50.49 does not require actions that prevent aging effects.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/Inspected:	A EQ component qualified life is not based on condition or performance monitoring.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

4. Detection of Aging Effects:	A The 10 CFR 50.49 does not require the detection of aging effects for in-service components.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
5. Monitoring and Trending:	A The 10 CFR 50.49 does not require monitoring and trending of component condition or performance parameters of in-service components to manage the effects of aging.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A 10 CFR 50.49 acceptance criteria are that an inservice EQ component is maintained within the bounds of its qualification basis, including (a) its established qualified life and (b) continued qualification for the projected accident conditions.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B When monitoring is used to modify a component qualified life, plant-specific acceptance criteria are established based on applicable 10 CFR 50.49(f) qualification methods.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timelessness, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
9. Administrative Controls:	<p>A EQ programs are implemented through the use of station policy, directives, and procedures. EQ programs will continue to comply with 10 CFR 50.49 throughout the renewal period, including development and maintenance of qualification documentation demonstrating reasonable assurance that a component can perform required functions during harsh accident conditions</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>“</p>	<p>B EQ program documents identify the applicable environmental conditions for the component locations.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>“</p>	<p>C EQ program qualification files are maintained at the plant site in an auditable form for the duration of the installed life of the component.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>“</p>	<p>D EQ program documentation is controlled under the station's quality assurance program.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

10. Operating Experience:	A EQ programs include consideration of operating experience to modify qualification bases and conclusions, including qualified life. Compliance with 10 CFR 50.49 provides reasonable assurance that components can perform their intended functions during accident conditions after experiencing the effects of inservice aging.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
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EXCEPTIONS

Item Number	Program Elements	LRA Exception Description	Basis for Accepting Exception	Documents Reviewed (Identifier, Para.# and/or Page #)
1.				
2.				
...				

ENHANCEMENTS

Item Number	Program Elements	LRA Enhancement Description	Basis for Accepting Enhancement	Documents Reviewed (Identifier, Para.# and/or Page #)
1.				
2.				
...				

Document Reviewed During Audit:

DOCUMENT NUMBER	IDENTIFIER (NUMBER)	TITLE	REVISION AND/OR DATE
1.			
2.			
3.			
4.			
....			

AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

REVIEWER: _____

DATE: _____

GALL AMP: X.M1 Metal Fatigue of Reactor Coolant Pressure Boundary

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A In order not to exceed the design limit on fatigue usage, the aging management program (AMP) monitors and tracks the number and the severity of critical thermal and pressure transients for the selected reactor coolant system components.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B AMP addresses the effects of the coolant environment on component fatigue life by assessing the impact of the reactor coolant environment on a sample of critical components for the plant. Examples of critical components are identified in NUREG/CR-6260.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C The sample of critical components can be evaluated by applying environmental correction factors to the existing ASME Code fatigue analyses. Formulas for calculating the environmental life correction factors are contained in NUREG/CR-6583 for carbon and low-alloy steels and in NUREG/CR-5704 for austenitic stainless steels.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	D As evaluated below, this is an acceptable option for managing metal fatigue for the reactor coolant pressure boundary, considering environmental effects. Thus, no further evaluation is recommended for license renewal if the applicant selects this option under 10 CFR 54.21(c)(1)(iii) to evaluate metal fatigue for the reactor coolant pressure boundary.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
1. Scope of Program:	A The program includes preventive measures to mitigate fatigue cracking of metal components of the reactor coolant pressure boundary caused by anticipated cyclic strains in the material.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
2. Preventive Actions:	A Maintaining the fatigue usage factor below the design code limit and considering the effect of the reactor water environment, as described under the program description, will provide adequate margin against fatigue cracking of reactor coolant system components due to anticipated cyclic strains.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/Inspected:	A The program monitors all plant transients that cause cyclic strains, which are significant contributions to the fatigue usage factor. The number of plant transients that cause significant fatigue usage for each critical reactor coolant pressure boundary component is to be monitored.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Alternatively, more detailed local monitoring of the plant transient may be used to compute the actual fatigue usage for each transient.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

4. Detection of Aging Effects:	A The program provides for periodic update of the fatigue usage calculations.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
5. Monitoring and Trending:	A The program monitors a sample of high fatigue usage locations. As a minimum, this sample is to include the locations identified in NUREG/CR-6260 and any additional critical components in the plants.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A Maintain the fatigue usage below the design code limit considering environmental fatigue effects.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	A For programs that monitor a sample of high fatigue usage locations, corrective actions include a review of additional affected reactor coolant pressure boundary locations.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A The program reviews industry experience regarding fatigue cracking. Applicable experience with fatigue cracking is to be considered in selecting the monitored locations.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

EXCEPTIONS

Item Number	Program Elements	LRA Exception Description	Basis for Accepting Exception	Documents Reviewed (Identifier, Para.# and/or Page #)
1.				
2.				
...				

ENHANCEMENTS

Item Number	Program Elements	LRA Enhancement Description	Basis for Accepting Enhancement	Documents Reviewed (Identifier, Para.# and/or Page #)
1.				
2.				
...				

Document Reviewed During Audit:

DOCUMENT NUMBER	IDENTIFIER (NUMBER)	TITLE	REVISION AND/OR DATE
1.			
2.			
3.			

AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

REVIEWER: _____

DATE: _____

GALL AMP: XI.E1 Electrical Cables and Connections not Subject to 10 CFR 50.49 Environmental Qualification Requirements

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The purpose of the aging management program described herein is to provide reasonable assurance that the intended functions of electrical cables and connections that are not subject to the environmental qualification requirements of 10 CFR 50.49 and are exposed to adverse localized environments caused by heat, radiation, or moisture will be maintained consistent with the current licensing basis through the period of extended operation. This program considers the technical information and guidance provided in NUREG/CR-5643, IEEE Std. P1205, SAND96-0344, and EPRI TR-109619.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The program described herein is written specifically to address cables and connections at plants whose configuration is such that most (if not all) cables and connections installed in adverse localized environments are accessible.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Since they are not subject to the environmental qualification requirements of 10 CFR 50.49, the electrical cables and connections covered by this aging management program are either not exposed to harsh accident conditions or are not required to remain functional during or following an accident to which they are exposed.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment

1. Scope of Program	A This inspection program applies to accessible electrical cables and connections within the scope of license renewal that are installed in adverse localized environments caused by heat or radiation in the presence of oxygen	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
2. Preventive Actions:	A This is an inspection program and no actions are taken as part of this program to prevent or mitigate aging degradation.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
3. Parameters Monitored/Inspected:	A A representative sample of accessible electrical cables and connections installed in adverse localized environments are visually inspected for cable and connection jacket surface anomalies. Technical basis for the sample selected is to be provided.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
4. Detection of Aging Effects:	A Accessible electrical cables and connections installed in adverse localized environments are visually inspected at least once every 10 years.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	B The first inspection for license renewal is to be completed before the period of extended operation.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

5. Monitoring and Trending:	A Trending actions are not included as part of this program because the ability to trend inspection results is limited.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A the accessible cables and connections are to be free from unacceptable, visual indications of surface anomalies, which suggest that conductor insulation or connection degradation exists. An unacceptable indication is defined as a noted condition or situation that, if left unmanaged, could lead to a loss of the intended function.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	A All unacceptable visual indications of cable and connection jacket surface anomalies are subject to an engineering evaluation. Such an evaluation is to consider the age and operating environment of the component, as well as the severity of the anomaly and whether such an anomaly has previously been correlated to degradation of conductor insulation or connections.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A Operating experience has shown that adverse localized environments caused by heat or radiation for electrical cables and connections may exist next to or above (within three feet of) steam generators, pressurizers or hot process pipes, such as feedwater lines. These adverse localized environments have been found to cause degradation</p> <p>of the insulating materials on electrical cables and connections that is visually observable, such</p> <p>as color changes or surface cracking. These visual indications can be used as indicators of degradation.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

EXCEPTIONS

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AUDIT WORKSHEET
GALL REPORT AMP

PLANT: _____

LRA AMP: _____

REVIEWER: _____

DATE: _____

GALL AMP: XI.E2 Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	<p>A The purpose the aging management program described herein is to provide reasonable assurance that the intended functions of electrical cables that are not subject to the environmental qualification requirements of 10 CFR 50.49 and are used in circuits with sensitive, low-level signals exposed to adverse localized environments caused by heat, radiation or moisture will be maintained consistent with the current licensing basis through the period of extended operation. This program considers the technical information and guidance provided in NUREG/CR-5643, IEEE Std. P1205, SAND96-0344, and EPRI TR-109619.</p> <p>In this aging management program, either of two methods can be used to identify the existence of aging degradation. In the first method, calibration results or findings of surveillance testing programs are evaluated to identify the existence of cable aging degradation. In the second method, direct testing of the cable system id performed.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
	<p>B This program applies to high-range-radiation and neutron flux monitoring instrumentation cables in addition to other cables used in high voltage, low-level signal applications that are sensitive to reduction in IR.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment</p>

“	<p>C Since they are not subject to the environmental qualification requirements of 10 CFR 50.49, the electrical cables covered by this aging management program are either not exposed to harsh accident conditions or are not required to remain functional during or following an accident to which they are exposed.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment</p>
1. Scope of Program	<p>A This program applies to electrical cables and connections (cable system) used in circuits with sensitive, high voltage low-level signals such as radiation monitoring and nuclear instrumentation that are subject to aging management review.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment</p>
2. Preventive Actions:	<p>A No actions are taken as part of this to prevent or mitigate aging degradation.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
3. Parameters Monitored/Inspected:	<p>A The parameters monitored are determined from the specific calibration, surveillances or testing performed and are based on the specific instrumentation circuit under surveillance or being calibrated, as documented in in plant procedures.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
4. Detection of Aging Effects:	<p>A Review of calibration results or findings of surveillance programs can provide an indication of the existence of aging effects based on acceptance criteria related to instrumentation circuit performance.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	<p>B By reviewing the results obtained during normal calibration or surveillances, an applicant may detect severe aging degradation prior to the loss of the cable and connection intended function. The first reviews will be completed before the period of extended operation and at least every 10 years thereafter.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>C All calibration or surveillance results that fail to meet acceptance criteria will be reviews for aging effects when the results are available.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>D In cases where a calibration or surveillance program does not include the cabling system in the testing circuit, or as an alternative to the review of calibration results described above the applicant will perform cable system testing. A proven cable system test for detecting deterioration of the insulation system (such as insulation resistance tests, time domain reflectometry tests, or other testing judged to be effective in determining cable insulation condition as justified in the application) will be performed.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>E The test frequency of these cables shall be determined by the applicant based on engineering evaluation, but the test frequency shall be at least once every ten years.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>F The first test shall be completed before the period of extended operation.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

5. Monitoring and Trending:	A Trending actions are not included as part of this program because the ability to trend test results is dependent on the specific type of test chosen.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A Calibration results or findings of surveillance and cable system testing results are to be within the acceptance criteria, as set out in procedures.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	A Corrective actions such as recalibration and circuit trouble-shooting are implemented when calibration or surveillance results or findings of surveillances do not meet the acceptance criteria. An engineering evaluation is performed when the test acceptance criteria are not met in order to ensure that the intended functions of the electrical cable system can be maintained consistent with the current licensing basis. Such an evaluation is to consider the significance of the test results, the operability of the component, the reportability of the event, the extent of the concern, the potential root causes for not meeting the test acceptance criteria, the corrective actions required, and likelihood of recurrence.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A Operating experience has identified a case where a change in temperature across a high range radiation monitor cable in containment resulted in substantial change in the reading of the monitor. Changes in instrument calibration can be caused by degradation of the circuit cable and are one indication of potential electrical cable degradation.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

REVIEWER: _____

DATE: _____

GALL AMP: XI.E3 Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The purpose of the aging management program described herein is to provide reasonable assurance that the intended functions of inaccessible medium-voltage cables that are not subject to the environmental qualification requirements of 10 CFR 50.49 and are exposed to adverse localized environments caused by moisture while energized will be maintained consistent with the current licensing basis through the period of extended operation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B In this aging management program periodic actions are taken to prevent cables from being exposed to significant moisture, such as inspecting for water collection in cable manholes and conduit, and draining water, as needed.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C the electrical cables covered by this aging management program are either not exposed to harsh accident conditions or are not required to remain functional during or following an accident to which they are exposed	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

1. Scope of Program	<p>A This program applies to inaccessible (e.g., in conduit or direct buried) medium-voltage cables within the scope of license renewal that are exposed to significant moisture simultaneously with significant voltage. Significant moisture is defined as periodic exposures to moisture that last more than a few days (e.g., cable in standing water). Periodic exposures to moisture that last less than a few days (i.e., normal rain and drain) are not significant. Significant voltage exposure is defined as being subjected to system voltage for more than twenty-five percent of the time. The moisture and voltage exposures described as significant in these definitions, which are based on operating experience and engineering judgement, are not significant for medium-voltage cables that are designed for these conditions (e.g., continuous wetting and continuous energization is not significant for submarine cables).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment</p>
2. Preventive Actions:	<p>A Periodic actions are taken to prevent cables from being exposed to significant moisture, such as inspecting for water collection in cable manholes and conduit, and draining water, as needed.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
3. Parameters Monitored/Inspected:	<p>A In-scope medium-voltage cables exposed to significant moisture and significant voltage are tested to provide an indication of the condition of the conductor insulation.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
4. Detection of Aging Effects:	<p>A Medium-voltage cables exposed to significant moisture and significant voltage that are within the scope of this program are tested at least once every 10 years.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

5. Monitoring and Trending:	A Trending actions are not included as part of this program because the ability to trend test results is dependent on the specific type of method chosen.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A The acceptance criteria for each test is defined by the specific type of test performed and the specific cable tested.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	A An engineering evaluation is performed when the test acceptance criteria are not met in order to ensure that the intended functions of the electrical cables can be maintained consistent with the current licensing basis. Such an evaluation is to consider the significance of the test results, the operability of the component, the reportability of the event, the extent of the concern, the potential root causes for not meeting the test acceptance criteria, the corrective actions required, and the likelihood of recurrence. When an unacceptable condition or situation is identified, a determination is made as to whether the same condition or situation is applicable to other inaccessible, in-scope, medium-voltage cables.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A Operating experience has shown that cross linked polyethylene XLPE or high molecular weight polyethylene (HMWPE) insulation materials are most susceptible to water tree formation. The formation and growth of water trees varies directly with operating voltage. Treeing is much less prevalent in 4kV cables than those operated at 13 or 33kV. Also, minimizing exposure to moisture minimizes the potential for the development of water treeing. As additional operating experience is obtained, lessons learned can be used to adjust the program, as needed.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

REVIEWER: _____

DATE: _____

GALL AMP: XI.M1 ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	<p>A Title 10 of the Code of Federal Regulations, 10 CFR 50.55a, imposes the inservice inspection (ISI) requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI , for Class 1, 2, and 3 pressure-retaining components and their integral attachments in light-water cooled power plants. Inspection, repair, and replacement of these components are covered in Subsections IWB, IWC, and IWD, respectively in the 2001 edition including the 2002 and 2003 addenda. The program generally includes periodic visual, surface, and/or volumetric examination and leakage test of all Class 1, 2, and 3 pressure-retaining components and their integral attachments. The ASME Section XI inservice inspection program in accordance with Subsections IWB, IWC, or IWD has been shown to be generally effective in managing aging effects in Class 1, 2, or 3 components and their integral attachments in light-water cooled power plants. However, in certain cases, the ASME inservice inspection program is to be augmented to manage effects of aging for license renewal and is so identified in the GALL Report.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

1. Scope of Program	A The ASME Section XI program provides the requirements for ISI, repair, and replacement. The components within the scope of the program are specified in Subsections IWB-1100, IWC-1100, and IWD-1100 for Class 1, 2, and 3 components, respectively, and include all pressure-retaining components and their integral attachments in light-water cooled power plants.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
“	B The components described in Subsections IWB-1220, IWC-1220, and IWD-1220 are exempt from the examination requirements of Subsections IWB-2500, IWC-2500, and IWD-2500.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
2. Preventive Actions:	A Operation within the limits prescribed in the Technical Specifications.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/Inspected:	A The ASME Section XI ISI program detects degradation of components by using the examination and inspection requirements specified in ASME Section XI Tables IWB-2500-1, IWC-2500-1, or IWD-2500-1, respectively, for Class 1, 2, or 3 components.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A The extent and schedule of the inspection and test techniques prescribed by the program are designed to maintain structural integrity and ensure that aging effects will be discovered and repaired before the loss of intended function of the component.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	B Components are examined and tested as specified in Tables IWB-2500-1, IWC-2500-1, and IWD-2500-1, respectively, for Class 1, 2, and 3 components. The tables specify the extent and schedule of the inspection and examination methods for the components of the pressure-retaining boundaries. Alternative approved methods that meet the requirements of IWA-2240 are also specified in these tables.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	C The program uses three types of examination — visual, surface, and volumetric — in accordance with the general requirements of Subsection IWA-2000.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	D For BWRs, the nondestructive examination (NDE) techniques appropriate for inspection of vessel internals, including the uncertainties inherent in delivering and executing an NDE technique in a boiling water reactor (BWR), are included in the approved boiling water reactor vessel and internals project (BWRVIP)-03. Also, an applicant may use the guidelines of the approved BWRVIP-62 for inspection relief for vessel internal components with hydrogen water chemistry provided such relief is submitted under the provisions of 10 CRF 50.55a and approved by the staff.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
5. Monitoring and Trending:	A For Class 1, 2, or 3 components, the inspection schedule of IWB-2400, IWC-2400, or IWD-2400, respectively, and the extent and frequency of IWB-2500-1, IWC-2500-1, or IWD-2500-1, respectively, provides for timely detection of degradation.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	<p>B If flaw conditions or relevant conditions of degradation are evaluated in accordance with IWB-3100 or IWC-3100, or IWD-3100, and the component is qualified as acceptable for continued service, the areas containing such flaw indications and relevant conditions are reexamined during the next three inspection periods of IWB-2110 for Class 1 components, IWC-2410 for Class 2 Components, and IWD-2410 for Class 3 components.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>C Examinations that reveal indications that exceed the acceptance standards described below are extended to include additional examinations in accordance with IWB-2430, IWC-2430, or IWD-2430 (1995 edition) for Class 1, 2, or, 3 components, respectively.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
6. Acceptance Criteria:	<p>A Any indication or relevant conditions of degradation detected are evaluated in accordance with IWB-3000, IWC-3000, or IWD-3000, for Class 1, 2, or 3 components, respectively.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B Examination results are evaluated in accordance with IWB-3100, IWC-3100, or IWD-3100 by comparing the results with the acceptance standards of IWB-3400 and IWB-3500 or IWC-3400 and IWC-3500, or IWD-3400 and IWD-3500, respectively, for Class 1 or Class 2 and 3 components.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>C Flaws that exceed the size of allowable flaws, as defined in IWB-3500 or IWC-3500, are evaluated by using the analytical procedures of IWB-3600 or IWC-3600, respectively, for Class 1 or Class 2 and 3 components.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	<p>D Approved BWRVIP-14, BWRVIP-59, and BWRVIP-60 documents provide guidelines for evaluation of crack growth steels, nickel alloys, and low-alloy steels, respectively.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
7. Corrective Actions:	<p>A For Class 1, 2, and 3, respectively, repair is performed in conformance with IWB-4000, IWC-4000, and IWD-4000, and replacement according to IWB-7000, IWC-7000, and IWD-7000. Approved BWRVIP-44 and BWRVIP-45 documents, respectively, provide guidelines for weld repair of nickel alloys and for weldability of irradiated structural components.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B Approved BWRVIP-44 and BWRVIP-45 documents, respectively, provide guidelines for weld repair of nickel alloys and for weldability of irradiated structural components.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA, and on the basis document. If specific correction actions are described, these corrective actions are reviewed for adequacy, timelessness, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA, and on the basis document. If specific correction actions are described, these corrective actions are reviewed for adequacy, timelessness, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>

10. Operating Experience:	A Because the ASME Code is a consensus document that has been widely used over a long period, it has been shown to be generally effective in managing aging effects in Class 1, 2, and 3 components and their integral attachments in light-water cooled power plants (see Chapter I of the GALL Report, Vol. 2).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.M2 Water Chemistry

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	<p>A The main objective of this program is to mitigate damage caused by corrosion and stress corrosion cracking (SCC). The water chemistry program for boiling water reactors (BWRs) relies on monitoring and control of reactor water chemistry based on industry guidelines such as the boiling water reactor vessel and internals project (BWRVIP)-29 (Electric Power Research Institute [EPRI] TR-103515) or later revisions. The BWRVIP-29 has three sets of guidelines: one for primary water, one for condensate and feedwater, and one for control rod drive (CRD) mechanism cooling water. The water chemistry program for pressurized water reactors (PWRs) relies on monitoring and control of reactor water chemistry based on industry guidelines for primary water and secondary water chemistry such as EPRI TR-105714 and TR-102134 or later revisions. The water chemistry programs are generally effective in removing impurities from intermediate and high flow areas. The Generic Aging Lessons Learned (GALL) report identifies those circumstances in which the water chemistry program is to be augmented to manage the effects of aging for license renewal. Accordingly, in certain cases as identified in the GALL Report, verification of the effectiveness of the chemistry control program is undertaken to ensure that significant degradation is not occurring and the component's intended function will be maintained during the extended period of operation. As discussed in the GALL Report for these specific cases, an acceptable verification program is a one-time inspection of selected components at susceptible locations in the system.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

1. Scope of Program	<p>A The program includes periodic monitoring and control of known detrimental contaminants such as chlorides, fluorides (PWRs only), dissolved oxygen, and sulfate concentrations below the levels known to result in loss of material or cracking. Water chemistry control is in accordance industry guidelines such as BWRVIP-29 (EPRI TR-103515) for water chemistry in BWRs, EPRI TR-105714, for primary water chemistry in PWRs, and EPRI TR-102134, for secondary water chemistry in PWRs.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
2. Preventive Actions:	<p>A The program includes specifications for chemical species , sampling and analysis frequencies, and corrective actions for control of reactor water chemistry.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B System water chemistry is controlled to minimize contaminant concentration and mitigate loss of material due to general, crevice and pitting corrosion and cracking caused by SCC.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
3. Parameters Monitored/Inspected:	<p>A The concentration of corrosive impurities listed in the EPRI guidelines discussed above, which include chlorides, fluorides (PWRs only), sulfates, dissolved oxygen, and hydrogen peroxide, are monitored to mitigate degradation of structural materials. Water quality (pH and conductivity) is also maintained in accordance with the guidance. Chemical species and water quality are monitored by in process methods or through sampling. The chemistry integrity of the samples is maintained and verified to ensure that the method of sampling and storage will not cause a change in the concentration of the chemical species in the samples.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	<p>B <i>BWR Water Chemistry:</i> The guidelines in BWRVIP-29 (EPRI TR-103515) for BWR reactor water recommend that the concentration of chlorides, sulfates, and dissolved oxygen are monitored and kept below the recommended levels to mitigate corrosion. The two impurities, chlorides and sulfates, determine the coolant conductivity; dissolved oxygen, hydrogen peroxide, and hydrogen determine electrochemical potential (ECP). The EPRI guidelines recommend that the coolant conductivity and ECP are also monitored and kept below the recommended levels to mitigate SCC and corrosion in BWR plants. The EPRI guidelines in BWRVIP-29 (TR-103515) for BWR feedwater, condensate, and control rod drive water recommends that conductivity, dissolved oxygen level, and concentrations of iron and copper (feedwater only) are monitored and kept below the recommended levels to mitigate SCC. The EPRI guidelines in BWRVIP-29 (TR-103515) also include recommendations for controlling water chemistry in auxiliary systems: torus/pressure suppression chamber, condensate storage tank, and spent fuel pool.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>C <i>PWR Primary Water Chemistry:</i> The EPRI guidelines (EPRI TR-105714) for PWR primary water chemistry recommend that the concentration of chlorides, fluorides, sulfates, lithium, and dissolved oxygen and hydrogen are monitored and kept below the recommended levels to mitigate SCC of austenitic stainless steel, Alloy 600, and Alloy 690 components. TR-105714 provides guidelines for chemistry control in PWR auxiliary systems such as boric acid storage tank, refueling water storage tank, spent fuel pool, letdown purification systems, and volume control tank.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	<p>D <i>PWR Secondary Water Chemistry:</i> The EPRI guidelines (EPRI TR-102134) for PWR secondary water chemistry recommend monitoring and control of chemistry parameters (e.g., pH level, cation conductivity, sodium, chloride, sulfate, lead, dissolved oxygen, iron, copper, and hydrazine) to mitigate steam generator tube degradation caused by denting, intergranular attack (IGA), outer diameter stress corrosion cracking (ODSCC), or crevice and pitting corrosion. The monitoring and control of these parameters, especially the pH level, also mitigates general (carbon steel components), crevice, and pitting corrosion of the steam generator shell and the balance of plant materials of construction (e.g., carbon steel, stainless steel, and copper).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>4. Detection of Aging Effects:</p>	<p>A This is a mitigation program and does not provide for detection of any aging effects, such as loss of material and cracking.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>5. Monitoring and Trending:</p>	<p>A The frequency of sampling water chemistry varies (e.g., continuous, daily, weekly, or as needed) based on plant operating conditions and the EPRI water chemistry guidelines.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>6. Acceptance Criteria:</p>	<p>A Maximum levels for various contaminants are maintained below the system specific limits as indicated by the limits specified in the corresponding EPRI water chemistry guidelines. Any evidence of the presence of aging effects or unacceptable water chemistry results is evaluated, the root cause identified, and the condition corrected.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	<p>B Any evidence of the presence of aging effects or unacceptable water chemistry results is evaluated, the root cause identified, and the condition corrected.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>7. Corrective Actions:</p>	<p>A When measured water chemistry parameters are outside the specified range, corrective actions are taken to bring the parameter back within the acceptable range and within the time period specified in the EPRI water chemistry guidelines.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>8. Confirmation Process:</p>	<p>A Following corrective actions, additional samples are taken and analyzed to verify that the corrective actions were effective in returning the concentrations of contaminants such as chlorides, fluorides, sulfates, dissolved oxygen, and hydrogen peroxide to within the acceptable ranges.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>9. Administrative Controls:</p>	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>

10. Operating Experience:	<p>A BWR: Intergranular stress corrosion cracking (IGSCC) has occurred in small- and large-diameter BWR piping made of austenitic stainless steels and nickel-base alloys. Significant cracking has occurred in recirculation, core spray, residual heat removal (RHR) systems, and reactor water cleanup (RWCU) system piping welds. IGSCC has also occurred in a number of vessel internal components, including core shroud, access hole cover, top guide, and core spray spargers (Nuclear Regulatory Commission [NRC] Information Bulletin 80-13, NRC Information Notice [IN] 95-17, NRC General Letter [GL] 94-03, and NUREG-1544). No occurrence control systems exposed to sodium pentaborate solution has ever been reported (NUREG/CR-6001).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>“</p>	<p>B PWR Primary System: The primary pressure boundary piping of PWRs has generally not been found to be affected by SCC because of low dissolved oxygen levels and control of primary water chemistry. However, the potential for SCC exists due to inadvertent introduction of contaminants into the primary coolant system from unacceptable levels of contaminants in the boric acid; introduction through the free surface of the spent fuel pool, which can be a natural collector of airborne contaminants; or introduction of oxygen during cooldown (NRC IN 84-18). Ingress of demineralizer resins into the primary system has caused IGSCC of Alloy 600 vessel head penetrations (NRC IN 96-11, NRC GL 97-01). Inadvertent introduction of sodium thiosulfate into the primary system has caused IGSCC of steam generator tubes. The SCC has occurred in safety injection lines (NRC INs 97-19 and 84-18), charging pump casing cladding (NRC INs 80-38 and 94-63), instrument nozzles in safety injection tanks (NRC IN 91-05), and safety-related SS piping systems that contain oxygenated, stagnant, or essentially stagnant borated coolant (NRC IN 97-19). Steam generator tubes and plugs and Alloy 600 penetrations have experienced primary water stress corrosion cracking (PWSCC) (NRC INs 89-33, 94-87, 97-88, 90-10, and 96-11; NRC Bulletin 89-01 and its two supplements).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	C <i>PWR Secondary System:</i> Steam generator tubes have experienced ODSCC, IGA, wastage, and pitting (NRC I N 97-88, NRC GL 95-05). Carbon steel support plates in steam generators have experienced general corrosion. The steam generator shell has experienced pitting and stress corrosion cracking (NRC INs 82-37, 85-65, and 90-04).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
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EXCEPTIONS

Item Number	Program Elements	LRA Exception Description	Basis for Accepting Exception	Documents Reviewed (Identifier, Para.# and/or Page #)
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ENHANCEMENTS

Item Number	Program Elements	LRA Enhancement Description	Basis for Accepting Enhancement	Documents Reviewed (Identifier, Para.# and/or Page #)
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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.M3 Reactor Head Closure Studs

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A This program includes inservice inspection (ISI) in conformance with the requirements of the American Society of Mechanical Engineers (ASME), Code, Section XI, Subsection IWB (2001 edition including the 2002 and 2003 Addenda), Table IWB 2500-1	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The program includes preventive measures to mitigate cracking.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
1. Scope of Program	A The program ISI to detect cracking due to stress corrosion cracking (SSC) or intergranular stress corrosion cracking (IGSCC); loss of material due to wear; and coolant leakage from reactor vessel closure stud bolting for both boiling water reactors (BWRs) and pressurized water reactors (PWRs)	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B preventive measures of NRC Regulatory Guide 1.65 to mitigate cracking.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	<p>C The program is applicable to closure studs and nuts constructed from materials with a maximum tensile strength limited to less than 1,172 MPa (170 ksi) (Nuclear Regulatory Commission [NRC] Regulatory Guide [RG] 1.65).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
2. Preventive Actions:	<p>A preventive measures include avoiding the use of metal-plated stud bolting to prevent degradation due to corrosion or hydrogen embrittlement</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B to use manganese phosphate or other acceptable surface treatments and stable lubricants (RG 1.65).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
3. Parameters Monitored/Inspected:	<p>A The ASME Section XI ISI program detects and sizes cracks, detects loss of material, and detects coolant leakage by following the examination and inspection requirements specified in Table IWB-2500-1.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
4. Detection of Aging Effects:	<p>A The extent and schedule of the inspection and test techniques prescribed by the program are designed to maintain structural integrity and ensure that aging effects will be discovered and repaired before the loss of intended function of the component. Inspection can reveal cracking, loss of material due to corrosion or wear, and leakage of coolant.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	B The program uses visual, surface, and volumetric examinations in accordance with the general requirements of Subsection IWA-2000.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	C Components are examined and tested as specified in Table IWB-2500-1.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	D Examination category B-G-1, for pressure-retaining bolting greater than 2 in.diameter in reactor vessels specifies volumetric examination of studs in place, from the top of the nut to the bottom of the flange hole, and surface and volumetric examination of studs when removed.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	E Also specified are volumetric examination of flange threads and visual VT-1 examination of surfaces of nuts, washers, and bushings	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	F Examination category B-P for all pressure-retaining components, specifies visual VT-2 examination of all pressure-retaining boundary components during the system leakage test and the system hydrostatic test.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

5. Monitoring and Trending:	A The Inspection schedule of IWB-2400, and the extent and frequency of IWB-2500-1 provide timely detection of cracks, loss of material, and leakage.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A Any indication or relevant condition of degradation in closure stud bolting is evaluated in accordance with IWB-3100 by comparing ISI results with the acceptance standards of IWB-3400 and IWB-3500.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	Repair and replacement are performed in conformance with the requirements of IWB-400 and IWB-7000, respectively, and the material and inspection guidance of RG 1.65.	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:
8. Confirmation Process:	The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM. The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:
9. Administrative Controls:	The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM. The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

10. Operating Experience:	<p>A The SCC has occurred in BWR pressure vessel head studs (Stoller 1991). The aging management program (AMP) has provisions regarding inspection techniques and evaluation, material specifications, corrosion prevention, and other aspects of reactor pressure vessel head stud cracking. Implementation of the program provides reasonable assurance that the effects of cracking due to SCC or IGSCC and loss of material due to wear will be adequately managed so that the intended functions of the reactor head closure studs and bolts will be maintained consistent with the current licensing basis</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
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EXCEPTIONS

Item Number	Program Elements	LRA Exception Description	Basis for Accepting Exception	Documents Reviewed (Identifier, Para.# and/or Page #)
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ENHANCEMENTS

Item Number	Program Elements	LRA Enhancement Description	Basis for Accepting Enhancement	Documents Reviewed (Identifier, Para.# and/or Page #)
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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.M4 BWR Vessel ID Attachment Welds

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The program includes inspection and flaw evaluation in accordance with the guidelines of staff-approved boiling water reactor vessel and internals project (BWRVIP)-48	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B monitoring and control of reactor coolant water chemistry in accordance with the guidelines of BWRVIP-29 (Electric Power Research Institute [EPRI] TR-103515) to ensure the long – term integrity and safe operation of boiling water reactor (BWR) vessel inside diameter (ID) attachment welds.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
1. Scope of Program	A The program is focused on managing the effects of cracking due to stress corrosion cracking (SCC), including intergranular stress corrosion cracking (IGSCC).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The program contains preventive measures to mitigate SCC; inservice inspection (ISI) to detect cracking and monitor the effects of cracking on the intended function of the components; and repair and/or replacement, as needed, to maintain the ability to perform the intended function.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	C The guidelines of BWRVIP-48 include inspection recommendations and evaluation methodologies for the attachment welds between the vessel wall and vessel ID brackets that attach safety-related components to the vessel (e.g., jet pump riser braces and core-spray piping brackets).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
2. Preventive Actions:	A The BWRVIP-48 provides guidance on detection.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Reactor coolant water chemistry is monitored and maintained in accordance with the guidelines in BWRVIP-29 (EPRI TR-103515).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/Inspected:	A The program monitors the effects of SCC and IGSCC on the intended function of vessel attachment welds by detection and sizing of cracks by ISI in accordance with the guidelines of approved BWRVIP-48 and the requirements of the American Society of Mechanical Engineers (ASME) Code, Section XI, Table IWB 2500-1 (2001 edition including the 2002 and 2003 Addenda).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B An applicant may use the guidelines of BWRVIP-62 for inspection relief for vessel internal components with hydrogen water chemistry provided such relief is submitted under the provisions of 10 CRF 50.55a and approved by the staff.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A The extent and schedule of the inspection and test techniques prescribed by BWRVIP-48 guidelines	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	B Vessel ID attachment welds are inspected in accordance with the requirements of ASME Section XI, Subsection IWB, examination category B-N-2.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	C The inspection and evaluation guidelines of BWRVIP-48 recommend more stringent inspections for certain selected attachments. The guidelines recommend enhanced visual VT-1 examination of all safety-related attachments and those nonsafety-related attachments identified as being susceptible to IGSCC. Visual VT-1 examination is capable of achieving 1/32 in. resolution; the enhanced visual VT-1 examination method is capable of achieving a 1-mil wire resolution.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	D The nondestructive examination (NDE) techniques appropriate for inspection of BWR vessel internals including the uncertainties inherent in delivering and executing NDE techniques in a BWR, are included in BWRVIP-03.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
5. Monitoring and Trending:	A Inspections scheduled in accordance with IWB-2400 and approved BWRVIP-48 guidelines provide timely detection of cracks.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	B If flaws are detected, the scope of examination is expanded.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

6. Acceptance Criteria:	A Any indication detected is evaluated in accordance with ASME Section XI or the staff-approved BWRVIP-48 guidelines. B Applicable and approved BWRVIP-14, BWRVIP-59, and BWRVIP-60 documents provide guidelines or evaluation of crack growth in stainless steels (SSs), nickel alloys, and low-alloy steels, respectively.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
<p>“</p>	B Applicable and approved BWRVIP-14, BWRVIP-59, and BWRVIP-60 documents provide guidelines or evaluation of crack growth in stainless steels (SSs), nickel alloys, and low-alloy steels, respectively.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	A Repair and replacement procedures are equivalent to those requirements in the ASME Section XI. Repair is performed in conformance with IWB-4000 and replacement occurs according to IWB-7000.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
<p>“</p>	B As discussed in the appendix to this report, the staff finds that licensee implementation of the guidelines in BWRVIP-48, as modified, will provide an acceptable level of quality for inspection and flaw evaluation of the safety-related components addressed in accordance with 10 CFR Part 50, Appendix B, corrective actions.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
8. Confirmation Process:	A As discussed in the appendix to this report, the staff finds that licensee implementation of the guidelines in BWRVIP-48, as modified, will provide an acceptable level of quality for inspection and flaw evaluation of the safety-related components addressed in accordance with the 10 CFR Part 50, Appendix B, confirmation process and administrative controls.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A Cracking due to SCC, including IGSCC has occurred in BWR components. The program guidelines are based on evaluation of available information, including BWR inspection data and information on the elements that cause IGSCC, to determine which attachment welds may be susceptible to cracking. Implementation of the program provides reasonable assurance that cracking will be adequately managed and the intended functions of the vessel ID attachments will be maintained consistent with the current licensing basis (CLB) for the period of extended operation.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

EXCEPTIONS

Item Number	Program Elements	LRA Exception Description	Basis for Accepting Exception	Documents Reviewed (Identifier, Para.# and/or Page #)
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ENHANCEMENTS

Item Number	Program Elements	LRA Enhancement Description	Basis for Accepting Enhancement	Documents Reviewed (Identifier, Para.# and/or Page #)
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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.M5 BWR Feedwater Nozzle

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A This program includes enhanced inservice inspection (ISI) in accordance with the requirements of the American Society of Mechanical Engineers (ASME) Code, Section XI, Subsection IWB, Table IWB 2500-1 (2001 edition including the 2002 and 2003 Addenda) and the recommendation of General Electric (GE) NE-523-A71-0594	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B system modifications to mitigate cracking	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C The program specifics periodic ultrasonic inspection of critical regions of boiling water reactor (BWR) feedwater nozzle	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
1. Scope of Program	A The program includes enhanced ISI to monitor the effects of cracking on the intended function of the component and systems modifications to mitigate cracking.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

2. Preventive Actions:	A Mitigation occurs by systems modifications, such as removal of stainless steel cladding and installation of improved spargers.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Mitigation is also accomplished by changes to plant-operating procedures, such as improved feedwater control and rerouting of the reactor water cleanup system, to decrease the magnitude and frequency of temperature fluctuations.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/Inspected:	A The aging management program (AMP) monitors the effects of cracking on the intended function of the component by detection and sizing of cracks by ISI in accordance with ASME Section XI, Subsection IWB and the recommendation of GE NE-523-A71-0594.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A The GE NE-523-A71-0594 specifies UT of specific regions of the blend radius and bore. The UT examination techniques and personnel qualifications are in accordance with to the guidelines of GE NE-523-A71-0594. Based on the inspection method and techniques and plant-specific fracture mechanics assessments	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B inspection schedule is in accordance with Table 6-1 of GE NE-523-A71-0594	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Leakage monitoring may be used to modify the inspection interval.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

5. Monitoring and Trending:	A Inspections scheduled in accordance with GE NE523-A71-0594 provides timely detection of cracks.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A Any cracking is evaluated in accordance with IWB-3100 by comparing inspection results with the acceptance standards of IWB-3400 and IWB-3500.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	Repair is performed in conformance with IWB-4000 and replacement in accordance with IWB-7000.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:
9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

10. Operating Experience:	A Cracking has occurred in several BWR plants (NUREG-0619, NRC Generic Letter 81-11).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

REVIEWER: _____

DATE: _____

GALL AMP: XI.M6 BWR Control Rod Drive Return Line Nozzle

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A This program includes enhanced inservice inspection (ISI) in conformance with the American Society of Mechanical Engineers (ASME) Code, Section XI, Subsection IWB, Table IWB 2500-1 (2001 edition including the 2002 and 2003 Addenda) and the recommendations of NUREG-0619	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B system modifications and maintenance programs to mitigate cracking.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C The program specifies periodic liquid penetrant and ultrasonic inspection of critical regions of boiling water reactor (BWR) control rod drive return line (CRDRL) nozzle.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
1. Scope of Program	A The program includes systems modifications, enhanced ISI, and maintenance programs to monitor the effects of cracking on the intended function of CRDRL nozzles. .	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

2. Preventive Actions:	A Mitigation occurs by system modifications, such as rerouting the CRDRL to a system that connects to the reactor vessel. A one-time inspection.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B For some classes of BWRs, or those that can prove satisfactory system operation, mitigation also is accomplished by confirmation of proper return flow capability, two-pump operation and cutting and capping the CRDRL nozzle without rerouting.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/Inspected:	A The aging management program (AMP) monitors the effects if cracking on the intended function of the CRDL nozzles by detecting and sizing cracks by ISI in accordance with Table IWB 2500-1 and NUREG-0619.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A The extent and schedule of inspection, as delineated in NUREG 0619.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Inspection recommendations include liquid penetrant testing (PT) of the CRDRL nozzle blend radius and bore regions and the reactor vessel wall area beneath the nozzle, return-flow-capacity demonstration, CRD-system-performance testing and ultrasonic inspection of welded connections in the rerouted line. The inspection is to include base metal to a distance of one-pipe-wall thickness or 0.5 in., whichever is greater, on both sides of the weld.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

5. Monitoring and Trending:	A The inspection schedule of NUREG-0619 provides timely detection of cracks.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A Any cracking is evaluated in accordance with IWB-3100 by comparing inspection results with the acceptance standards of IWB-3400 and IWB-3500.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B All cracks found in the CRDRL nozzles are to be removed by grinding.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	A Repair is performed in conformance with IWB-4000 and replacement in accordance with IWB-7000.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A Cracking has occurred in several BWR plants (NUREG-0619 and Information Notice 2004-08). The present AMP has been implemented for nearly 20 years and found to be effective in managing the effect of cracking on the intended function of CRDRL nozzles.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

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Item Number	Program Elements	LRA Exception Description	Basis for Accepting Exception	Documents Reviewed (Identifier, Para.# and/or Page #)
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Item Number	Program Elements	LRA Enhancement Description	Basis for Accepting Enhancement	Documents Reviewed (Identifier, Para.# and/or Page #)
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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

REVIEWER: _____

DATE: _____

GALL AMP: XI.M7 BWR Stress Corrosion Cracking

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The program manage intergranular stress corrosion cracking (IGSCC) in boiling water reactor (BWR) coolant pressure boundary piping made of stainless steel (SS) and nickel based alloy components is delineated in NUREG-0313, Rev. 2, and Nuclear Regulatory Commission (NRC) Generic Letter (GL) 88-01 and its Supplement 1.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The program preventive measures to mitigate IGSCC system modifications and maintenance programs to mitigate cracking.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C inspection and flaw evaluation	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	D The staff-approved boiling water reactor vessel and internals project (BWRVIP-75) report allows for modifications to the inspection scope in the GL 88-01 program.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

1. Scope of Program	A managing and implementing countermeasures to mitigate IGSCC.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B performing inservice inspection (ISI) to monitor IGSCC and its effects on the intended function of BWR components.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C The program is applicable to all BWR piping made of austenitic SS and nickel alloy that is 4 in. or larger in nominal diameter and contains reactor coolant at a temperature above 93°C (200°F) during power operation, regardless of code classification. The program also applies to pump casings, valve bodies and reactor vessel attachments and appurtenances, such as head spray and vent components.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
	D NUREG-0313 and NRC GL 88-01, respectively, describe the technical basis and staff guidance regarding mitigation of IGSCC in BWRs.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	E Attachment A of NRC GL 88-01 delineates the staff approved positions regarding materials, processes, water chemistry, weld overlay reinforcement, partial replacement, stress improvement of cracked welds, clamping devices, crack characterization and repair criteria, inspection methods and personnel, inspection schedules, sample expansion, leakage detection, and reporting requirements.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

2. Preventive Actions:	A The program delineated in NUREG-0313 and NRC GL 88-01 and in the staff-approved BWRVIP-75 report includes recommendations regarding selection of materials that are resistant to sensitization, use of special processes that reduce residual tensile stresses, and monitoring and maintenance of coolant chemistry.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The resistant materials are used for new and replacement components and include low-carbon grades of austenitic SS and weld metal, with a maximum carbon of 0.035 wt.% and a minimum ferrite of 7.5% in weld metal and cast austenitic stainless steel (CASS). Inconel 82 is the only commonly used nickel-base weld metal considered to be resistant to SCC; other nickel-alloys, such as Alloy 600 are evaluated on an individual basis.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Special processes are used for existing, new, and replacement components. These processes include solution heat treatment, heat sink, welding, induction heating, and mechanical stress improvement.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	D Maintaining high water purity reduces susceptibility to SCC or IGSCC.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/Inspected:	A The program detects and sizes cracks and detects leakage by using the examination and inspection guidelines delineated in NUREG 0313, Rev. 2, and NRC GL 88-01 or the referenced BWRVIP-75 guideline as approved by the NRC staff.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

4. Detection of Aging Effects:	A The program uses volumetric examinations to detect IGSCC.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The NRC GL 88-01 recommends that the detailed inspection procedure, equipment, and examination personnel be qualified by a formal program approved by the NRC. These inspection guidelines, updated in the approved BWRVIP-75 document, provide the technical basis for revisions to NRC GL 88-01 inspection schedules.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C The extent and frequency of inspection recommended by the program are based on the condition of each weld (e.g., whether the weldments were made from IGSCC-resistant material, whether a stress improvement process was applied to a weldment to reduce residual stresses, and how the weld was repaired if it had been cracked).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	D The inspection guidance in approved BWRVIP-75 replaces the extent and schedule of inspection in NRC GL 88-01.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
5. Monitoring and Trending:	A Based on inspection results, NRC GL 88-01 or approved BWRVIP-75 guidelines provide guidelines for additional samples of welds to be inspected when one or more cracked welds are found in a weld category.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

6. Acceptance Criteria:	A As recommended in NRC GL 88-01, any indication detected is evaluated in accordance with the ASME Section XI, Subsection IWB-3600 of Section XI of the 1986 Edition of the ASME Boiler and Pressure Vessel Code and the guidelines of NUREG-0313.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Applicable and approved BWRVIP-14, BWRVIP-59, and BWRVIP-62 documents provide guidelines for evaluation of crack growth in SSs, nickel alloys, and low alloy steels. An applicant may use BWRVIP-61 guidelines for BWR vessel and internal induction heating stress improvement effectiveness on crack growth in operating plants.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	A The guidance for weld overlay repair and stress improvement or replacement is provided in NRC GL 88-01; ASME Section XI, Subsections IWB-4000 and IWB-7000, IWC-4000 and IWC-7000, or IWD-4000 and IWD-7000, respectively for Class 1, 2, or 3 components; and ASME Code Case N-504-1.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
8. Confirmation Process:	The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM. The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timelessness, root cause determination, and prevention of recurrence.	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:
9. Administrative Controls:	The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM. The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timelessness, root cause determination, and prevention of recurrence.	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

<p>10. Operating Experience:</p>	<p>A Intergranular stress corrosion cracking has occurred in small- and large-diameter BWR piping made of austenitic stainless steel and nickel-base alloys. Cracking has occurred in recirculation, core spray, residual heat removal (RHR), control rod drive (CRD) return line penetrations, and reactor water cleanup (RWCU) system piping welds (NRC GL 88-01, NRC Information Notices [INs] 82-39, 84-41, and 04-08). The comprehensive program outlined in NRC GL 88-01 and NUREG-0313 and in the staff-approved BWRVIP-75 report addresses mitigating measures for SCC or IGSCC (e.g., susceptible material, significant tensile stress, and an aggressive environment). The GL 88-01 program has been effective in managing IGSCC in BWR reactor coolant pressure-retaining components and the revision to the GL 88-01 program, according to the staff-approved BWRVIP-75 report, will adequately manage IGSCC degradation.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.M8 BWR Penetrations

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A inspection and flaw evaluation in conformance with the guidelines of staff-approved boiling water reactor vessel and internals project BWRVIP-49 and BWRVIP-27 documents	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	B Monitoring and control of reactor coolant water chemistry in accordance with guidelines of BWRVIP-29 (Electric Power Research Institute [EPRI] TR-103515) to ensure the long-term integrity and safe operation of boiling water reactor (BWR) vessel internal components.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	C BWRVIP-49 provides guidelines for instrument penetrations, and BWRVIP-27 addresses the standby liquid control (SLC) system nozzle or housing.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

1. Scope of Program	<p>A The inspection and evaluation guidelines of BWRVIP-49 and BWRVIP-27 contain generic guidelines intended to present appropriate inspection recommendations to assure safety function integrity. The guidelines of BWRVIP-49 provide information on the type of instrument penetration, evaluate their susceptibility and consequences of failure, and define the inspection strategy to assure safe operation. The guidelines of BWRVIP-27 are applicable to plants in which the SLC system injects sodium pentaborate into the bottom head region of the vessel (in most plants, as a pipe within a pipe of the core plate ΔP monitoring system). The BWRVIP-27 guidelines address the region where the ΔP and SLC nozzle or housing penetrates the vessel bottom head and include the safe ends welded to the nozzle or housing.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B Guidelines for repair design criteria are provided in BWRVIP-57 for instrumentation penetrations and BWRVIP-53 for SLC line.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
2. Preventive Actions:	<p>A Maintaining high water purity reduces susceptibility to SCC or IGSCC. Reactor coolant water chemistry is monitored and maintained in accordance with the guidelines in BWRVIP-29 (EPRI TR-103515).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
3. Parameters Monitored/Inspected:	<p>A The program monitors the effects of SCC/IGSCC on the intended function of the component by detection and sizing of cracks by ISI in accordance with the guidelines of approved BWRVIP-49 or BWRVIP-27 and the requirements of the American Society of Mechanical Engineers (ASME) Code, Section XI, Table IWB 2500-1 (2001 edition including the 2002 and 2003 Addenda).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	<p>B An applicant may use the guidelines of BWRVIP-62 for inspection relief for vessel internal components with hydrogen water chemistry provided such relief is submitted under the provisions of 10 CRF 50.55a and approved by the staff.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>4. Detection of Aging Effects:</p>	<p>A The evaluation guidelines of BWRVIP-49 and BWRVIP-27 recommend that the inspection requirements currently in ASME Section XI continue to be followed. The extent and schedule of the inspection and test techniques prescribed by the ASME Section XI program are designed to maintain structural integrity and ensure that aging effects will be discovered and repaired before the loss of intended function of the component. Inspection can reveal cracking and leakage of coolant.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B uncertainties inherent in delivering and executing NDE techniques in a BWR, are included in BWRVIP-03</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>C Instrument penetrations and SLC system nozzles or housings are inspected in accordance with the requirements of ASME Section XI, Subsection IWB. Components are examined and tested as specified in Table IWB-2500-1, examination categories B-E for pressure-retaining partial penetration welds in vessel penetrations, B-D for full penetration nozzle-to-vessel welds, B-F for pressure-retaining dissimilar metal nozzle-to-safe end welds, or B-J for similar metal nozzle-to-safe end welds. In addition, these components are part of examination category B-P for pressure-retaining boundary.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

5. Monitoring and Trending:	A Inspections scheduled in accordance with IWB-2400 and approved BWRVIP-48 or BWRVIP-27 provide timely detection of cracks.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The scope of examination expansion and reinspection beyond the baseline inspection are required if flaws are detected.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A Any indication detected is evaluated in accordance with ASME Section XI or other acceptable flaw evaluation criteria, such as the staff-approved BWRVIP-49 or BWRVIP-27 guidelines.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Applicable and approved BWRVIP-14, BWRVIP-59, and BWRVIP-60 documents provide guidelines for evaluation of crack growth in stainless steels (SSs), nickel alloys, and low-alloy steels, respectively.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	A Repair and replacement procedures in staff-approved BWRVIP-57 and BWRVIP-53 are equivalent to those required in the ASME Section XI. Guidelines for repair design criteria are provided in BWRVIP-57 for instrumentation penetrations and BWRVIP-53 for standby liquid control line.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	<p>B As discussed in the appendix to this report, the staff finds that licensee implementation of the guidelines in BWRVIP-48, as modified, will provide an acceptable level of quality for inspection and flaw evaluation of the safety-related components addressed in accordance with 10 CFR Part 50, Appendix B, corrective actions.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>8. Confirmation Process:</p>	<p>A As discussed in the appendix to this report, the staff finds that licensee implementation of the guidelines in BWRVIP-48, as modified, will provide an acceptable level of quality for inspection and flaw evaluation of the safety-related components addressed in accordance with the 10 CFR Part 50, Appendix B, confirmation process and administrative controls.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>9. Administrative Controls:</p>	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
<p>10. Operating Experience:</p>	<p>A Cracking due to SCC or IGSCC has occurred in BWR components made of austenitic stainless steels and nickel alloys. The program guidelines are based on evaluation of available information, including BWR inspection data and information about the elements that cause IGSCC, to determine which locations may be susceptible to cracking. Implementation of the program provides reasonable assurance that cracking will be adequately managed so SLC system nozzles or housings will be maintained consistent with the current licensing basis (CLB) for the period of extended operation.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

EXCEPTIONS

Item Number	Program Elements	LRA Exception Description	Basis for Accepting Exception	Documents Reviewed (Identifier, Para.# and/or Page #)
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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

REVIEWER: _____

DATE: _____

GALL AMP: XI.M13 Thermal Aging & Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS)

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The reactor vessel internals receive a visual inspection in accordance with the American Society of Mechanical Engineers (ASME) Code Section XI, Subsection IWB, Category B-N-3. This inspection is augmented to detect the effects of loss of fracture toughness due to thermal aging and neutron irradiation embrittlement of cast austenitic stainless steel (CASS) reactor vessel internals.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	B This aging management program (AMP) includes (a) identification of susceptible components determined to be limiting from the standpoint of thermal aging susceptibility (i.e., ferrite and molybdenum contents, casting process, and operating temperature) and/or neutron irradiation embrittlement (neutron fluence),	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	<p>C (b) for each “potentially susceptible” component, aging management is accomplished through either a supplemental examination of the affected component based on the neutron fluence to which the component has been exposed as part of the applicant’s 10-year inservice inspection (ISI) program during the license renewal term, or a component-specific evaluation to determine its susceptibility to loss of fracture toughness</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
1. Scope of Program:	<p>A The program provides screening criteria to determine the susceptibility of CASS components to thermal aging on the basis of casting method, molybdenum content, and percent ferrite.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment</p>
“	<p>B The screening criteria are applicable to all primary pressure boundary and reactor vessel internal components constructed from SA-351 Grades CF3, CF3A, CF8, CF8A, CF3M, CF3MA, CF8M, with service conditions above 250°C (482°F).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>C The screening criteria for susceptibility to thermal aging embrittlement are not applicable to niobium-containing steels; such steels require evaluation on a case-by-case basis.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	<p>D For “potentially susceptible” components, the program provides for the consideration of the synergistic loss of fracture toughness due to neutron embrittlement and thermal aging embrittlement. For each such component, an applicant can implement either (a) a supplemental examination of the affected component as part of a 10-year ISI program during the license renewal term, or (b) a component-specific evaluation to determine the component’s susceptibility to loss of fracture toughness.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>E For low-molybdenum content (0.5 wt.% max.) steels, only static-cast steels with >20% ferrite are potentially susceptible to thermal embrittlement.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>F Static-cast low-molybdenum steels with ≤20% ferrite and all centrifugal-cast low-molybdenum steels are not susceptible.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>G For high-molybdenum content (2.0 to 3.0 wt.%) steels, static-cast steels with >14% ferrite and centrifugal-cast steels with >20% ferrite are potentially susceptible to thermal embrittlement.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>H Static-cast high-molybdenum steels with ≤14% ferrite and centrifugal-cast high-molybdenum steels with ≤20% ferrite are not susceptible.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	<p>I In the susceptibility screening method, ferrite content is calculated by using the Hull's equivalent factors (described in NUREG/CR-4513, Rev. 1) or a method producing an equivalent level of accuracy ($\pm 6\%$ deviation between measured and calculated values).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>J A fracture toughness value of 255 kJ/m^2 ($1,450 \text{ in.-lb/in.}^2$) at a crack depth of 2.5 mm (0.1 in.) is used to differentiate between CASS materials that are nonsusceptible and those that are potentially susceptible to thermal aging embrittlement. Extensive research data indicate that for nonsusceptible CASS materials, the saturated lower-bound fracture toughness is greater than 255 kJ/m^2 (NUREG/CR-4513, Rev. 1).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
2. Preventive Actions:	<p>A The program consists of evaluation and inspection and provides no guidance on methods to mitigate thermal aging, neutron irradiation embrittlement or void swelling.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
3. Parameters Monitored/Inspected:	<p>A The program specifics depend on the neutron fluence and thermal embrittlement susceptibility of the component. The AMP monitors the effects of loss of fracture toughness on the intended function of the component by identifying the CASS materials that either have a neutron fluence of greater than 10^{17} n/cm^2 ($E > 1 \text{ MeV}$) or are determined to be susceptible to thermal aging embrittlement. For such materials, the program consists of either supplemental examination of the affected component based on the neutron fluence to which the component has been exposed, or component-specific evaluation to determine the component's susceptibility to loss of fracture toughness.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

4. Detection of Aging Effects:	A For reactor vessel internal CASS components that have a neutron fluence of greater than 10^{17} n/cm ² (E>1 MeV) or are determined to be susceptible to thermal embrittlement, the 10-year ISI program during the renewal period includes a supplemental inspection covering portions of the susceptible components determined to be limiting from the standpoint of thermal aging susceptibility (i.e., ferrite and molybdenum contents, casting process, and operating temperature), neutron fluence, and cracking susceptibility (i.e., applied stress, operating temperature, and environmental conditions).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The inspection technique is capable of detecting the critical flaw size with adequate margin. The critical flaw size is determined based on the service loading condition and service-degraded material properties. One example of a supplemental examination is enhancement of the visual VT-1 examination of Section XI IWA-2210. A description of such an enhanced visual VT-1 examination could include the ability to achieve a 0.0005-in. resolution, with the conditions (e.g., lighting and surface cleanliness) of the inservice examination bounded by those used to demonstrate the resolution of the inspection technique.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C If the loading is compressive or low enough (<5 ksi) to preclude fracture, then supplemental inspection of the component is not required. Failure to meet this criterion requires continued use of the supplemental inspection program.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	D For each CASS component that has been subjected to a neutron fluence of less than 10^{17} n/cm ² (E>1 MeV) and is potentially susceptible to thermal aging, the supplement inspection program applies; otherwise, the existing ASME Section XI inspection requirements are adequate if the components are not susceptible to thermal aging embrittlement.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

5. Monitoring and Trending:	A Inspection schedules in accordance with IWB-2400 and reliable examination methods provide timely detection of cracks.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A Flaws detected in CASS components are evaluated in accordance with the applicable procedures of IWB-3500. Flaw tolerance evaluation for components with ferrite content up to 25% is performed according to the principles associated with IWB-3640 procedures for submerged arc welds (SAW), disregarding the Code restriction of 20% ferrite in IWB-3641(b)(1).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Flaw evaluation for CASS components with >25% ferrite is performed on a case-by-case basis by using fracture toughness data provided by the applicant.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	A Repair is performed in conformance with IWA-4000 and IWB-4000, and replacement in accordance with IWA-7000 and IWB-7000.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A The AMP was developed by using research data obtained on both laboratory-aged and service-aged materials. Based on this information, the effects of thermal aging embrittlement on the intended function of CASS components are effectively managed.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

REVIEWER: _____

DATE: _____

GALL AMP: XI.M17 Flow-Accelerated Corrosion

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	The program relies on implementation of the Electric Power Research Institute (EPRI) guidelines in the Nuclear Safety Analysis Center (NSAC)-202L-R2 for an effective flow-accelerated corrosion (FAC) program. The program includes performing (a) B an analysis to determine critical locations, (b) C limited baseline inspections to determine the extent of thinning at these locations, and (c) D follow-up inspections to confirm the predictions, or repairing or replacing components as necessary.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
1. Scope of Program	A The FAC program, described by the EPRI guidelines in NSAC-202L-R2, includes procedures or administrative controls to assure that the structural integrity of all carbon steel lines containing high-energy fluids (two phase as well as single phase) is maintained.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	B Valve bodies retaining pressure in these high-energy systems are also covered by the program.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	<p>C A program implemented in accordance with the EPRI guidelines predicts, detects, and monitors FAC in plant piping and other components, such as valve bodies, elbows and expanders. Such a program includes the following recommendations: (a) conducting an analysis to determine critical locations; (b) performing limited baseline inspections to determine the extent of thinning at these locations; and (c) performing follow-up inspections to confirm the predictions, or repairing or replacing components as necessary.</p>	<p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
2. Preventive Actions:	<p>A The FAC program is an analysis, inspection, and verification program; thus, there is no preventive action.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
3. Parameters Monitored/Inspected:	<p>A The aging management program (AMP) monitors the effects of FAC on the intended function of piping and components by measuring wall thickness.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
4. Detection of Aging Effects:	<p>A Degradation of piping and components occurs by wall thinning. The inspection program delineated in NSAC-202L consists of identification of susceptible locations as indicated by operating conditions or special considerations.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B Ultrasonic and radiographic testing is used to detect wall thinning. The extent and schedule of the inspections assure detection of wall thinning before the loss of intended function</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

5. Monitoring and Trending:	A CHECWORKS or a similar predictive code is used to predict component degradation in the systems conducive to FAC, as indicated by specific plant data, including material, hydrodynamic, and operating conditions.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The inspection schedule developed by the licensee on the basis of the results of such a predictive code provides reasonable assurance that structural integrity will be maintained between inspections.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Inspection results are evaluated to determine if additional inspections are needed to assure that the extent of wall thinning is adequately determined, assure that intended function will not be lost, and identify corrective actions.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
6. Acceptance Criteria:	A Inspection results are input to a predictive computer code, such as CHECWORKS, to calculate the number of refueling or operating cycles remaining before the component reaches the minimum allowable wall thickness.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B If calculation indicate that an area will reach the minimum allowed thickness before the next schedule outage, the component is to be repaired, replaced, or reevaluated.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	A Prior to service, components for which the acceptance criteria are not satisfied are reevaluated, repaired, or replaced. Long-term corrective actions could include adjusting operating parameters or selecting materials resistant to FAC.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A Wall-thinning problems in single-phase systems have occurred in feedwater and condensate systems (NRC IE Bulletin No. 87-01; NRC Information Notices [INs] 81-28, 92-35, 95-11) and in two-phase piping in extraction steam lines (NRC INs 89-53, 97-84) and moisture separation reheater and feedwater heater drains (NRC INs 89-53, 91-18, 93-21, 97-84). Operating experience shows that the present program, when properly implemented, is effective in managing FAC in high-energy carbon steel piping and components.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.M20 Open-Cycle Cooling Water System

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The program relies on implementation of the recommendations of the Nuclear Regulatory Commission (NRC) Generic Letter (GL) 89-13 to ensure that the effects of aging on the open-cycle cooling water (OCCW) (or service water) system will be managed for the extended period of operation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The program includes surveillance and control techniques to manage aging effects caused by biofouling, corrosion, erosion, protective coating failures, and silting in the OCCW system or structures and components serviced by the OCCW system.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
1. Scope of Program	A The program addresses the aging effects of material loss and fouling due to micro- or macro-organisms and various corrosion mechanisms.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	<p>B Because the characteristics of the service water system may be specific to each facility, the OCCW system is defined as a system or systems that transfer heat from safety-related systems, structures, and components (SSC) to the ultimate heat sink (UHS). If an intermediate system is used between the safety-related SSCs and the system rejecting heat to the UHS, that intermediate system performs the function of a service water system and is thus included in the scope of recommendations of NRC GL 89-13.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>C The guidelines of NRC GL 89-13 include (a) surveillance and control of biofouling;(b) a test program to verify heat transfer capabilities; (c) routine inspection and a maintenance program to ensure that corrosion, erosion, protective coating failure, silting, and biofouling cannot degrade the performance of safety-related systems serviced by OCCW; (d) a system walkdown inspection to ensure compliance with the licensing basis; and (e) a review of maintenance, operating, and training practices and procedures.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
2. Preventive Actions:	<p>A Implementation of NRC GL 89-13 includes a condition and performance monitoring program; control or preventive measures, such as chemical treatment, whenever the potential for biological fouling species exists; or flushing of infrequently used systems.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
3. Parameters Monitored/Inspected:	<p>A Cleanliness and material integrity of piping, components, heat exchangers, elastomers, and their internal linings or coatings (when applicable) that are part of the OCCW system or that are cooled by the OCCW system are periodically inspected, monitored, or tested to ensure heat transfer capabilities.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B The program ensures (a) removal of accumulations of biofouling agents, corrosion products, and silt, and (b) detection of defective protective coatings and corroded OCCW system piping and components that could adversely affect performance of their intended safety functions.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

4. Detection of Aging Effects:	A Inspections for biofouling, damaged coatings, and degraded material condition are conducted. Visual inspections are typically performed; however, nondestructive testing, such as ultrasonic testing, eddy current testing, and heat transfer capability testing, are effective methods to measure surface condition and the extent of wall thinning associated with the service water system piping and components, when determined necessary.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
5. Monitoring and Trending:	A Inspection scope, method (e.g., visual or nondestructive examination [NDE]), and testing frequencies are in accordance with the utility commitments under NRC GL 89-13.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Testing and inspections are done annually and during refueling outages	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Inspections or nondestructive testing will determine the extent of biofouling, the condition of the surface coating, the magnitude of localized pitting, and the amount of MIC, if applicable.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	D Heat transfer testing results are documented in plant test procedures and are trended and reviewed by the appropriate group.	(s) used to confirm Criteria: Comment:

6. Acceptance Criteria:	A Biofouling is removed or reduced as part of the surveillance and control process.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Acceptance criteria are based on effective cleaning of biological fouling organisms and maintenance of protective coating or linings are emphasized.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	A Evaluations are performed for test or inspection results that do not satisfy established acceptance criteria and a problem or condition report is initiated to document the concern in accordance with plant administrative procedures. The corrective actions program ensures that the conditions adverse to quality are promptly corrected. If the deficiency is assessed to be significantly adverse to quality, the cause of the condition is determined, and an action plan is developed to preclude repetition.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
8. Confirmation Process:	The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM. The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timelessness, root cause determination, and prevention of recurrence.	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A Significant microbiologically influenced corrosion (NRC Information Notice [IN] 85-30), failure of protective coatings (NRC IN 85-24), and fouling (NRC IN 81-21, IN 86-96) have been observed in a number of heat exchangers. The guidance of NRC GL 89-13 has been implemented for approximately 10 years and has been effective in managing aging effects due to biofouling, corrosion, erosion, protective coating failures, and sitting in structures and components serviced by OCCW systems.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

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Item Number	Program Elements	LRA Enhancement Description	Basis for Accepting Enhancement	Documents Reviewed (Identifier, Para.# and/or Page #)
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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.M21 Closed-Cycle Cooling Water System

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The program includes (a) preventive measures to minimize corrosion, and stress corrosion cracking (SCC) and (b) testing and inspection to monitor the effects of corrosion and (SCC) on the intended function of the component.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The program relies on maintenance of system corrosion inhibitor concentrations within specified limits of Electric Power Research Institute (EPRI) TR-107396 to minimize corrosion and SCC.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Non chemistry monitoring techniques such as testing and inspection in accordance with guidance in EPRI TR-107396 for closed-cycle cooling water (CCCW) systems provide one acceptable method to evaluate system and component performance.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

1. Scope of Program	A A CCCW system is defined as part of the service water system that is not subject to significant sources of contamination, in which water chemistry is controlled and in which heat is not directly rejected to a heat sink. The program described in this section applies only to such a system. If one or more of these conditions are not satisfied, the system is to be considered an open-cycle cooling water system. The staff notes that If the adequacy of cooling water chemistry control can not be confirmed, the system is treated as an open-cycle system as indicated in Action III of Generic Letter (GL) 89-13.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
2. Preventive Actions:	A The program relies on the maintenance of system corrosion inhibitor concentrations within specified limits of EPRI TR-107396	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The program includes monitoring and control of cooling water chemistry to minimize exposure to aggressive environments	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C application of corrosion inhibitor in the CCCW system to mitigate general, crevice, and pitting corrosion as well as SCC.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/Inspected:	A testing and inspection in accordance with guidance in EPRI TR-107396 to evaluate system and component condition.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	B For pumps, the parameters monitored include flow and discharge and suction pressures.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C For heat exchangers, the parameters monitored include flow, inlet and outlet temperatures, and differential pressure.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A The extent and schedule of inspections and testing in accordance with EPRI TR-107396	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Performance and functional testing in accordance with EPRI TR-107396	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C For systems and components in continuous operation, performance adequacy should be verified by monitoring component performance through data trends for evaluation of heat transfer capability, system branch flow changes and chemistry data trends.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	D Components not normally in operation are periodically tested to ensure operability.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
5. Monitoring and Trending:	A The frequency of sampling water chemistry varies and can occur on a continuous, daily, weekly, or as needed basis, as indicated by plant operating conditions and the type of chemical treatment.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B In accordance with EPRI TR-107396, internal visual inspections and performance/functional tests are to be performed periodically to demonstrate system operability and confirm the effectiveness of the program.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Tests to evaluate heat removal capability of the system and degradation of system components may also be used. The testing intervals should be established based on plant-specific considerations such as system conditions, trending, and past operating experience, and may be adjusted on the basis of the results of a reliability analysis, type of service, frequency of operation, or age of components and systems.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	D The testing intervals may be adjusted on the basis of the results of the reliability analysis, type of service, frequency of operation, or age of components and systems.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

6. Acceptance Criteria:	A Corrosion inhibitor concentrations are maintained within the limits specified in the EPRI water chemistry guidelines for CCCW.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B System and component performance test results are evaluated in accordance with system and component design basis requirements.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Acceptance criteria and tolerances are to be based on system design parameters and functions.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	A Corrosion inhibitor concentrations outside the allowable limits are returned to the acceptable range within the time period specified in the EPRI water chemistry guidelines for CCCW.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B If the system or component fails to perform adequately, corrective actions are taken.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A Degradation of closed-cycle cooling water systems due to corrosion product buildup (NRC Licensee Event Report [LER] 50-327/93-029-00) or through-wall cracks in supply lines (NRC 50-280/91-019-00) has been observed in operating plants. Accordingly, operating experience demonstrates the need for this program.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.M22 Boraflex Monitoring

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A A Boraflex monitoring program for the actual Boraflex panels is implemented in the spent fuel racks to assure that no unexpected degradation of the Boraflex material would compromise the criticality analysis in support of the design of spent fuel storage racks	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	B The applicable aging management program (AMP), based on manufacturer's recommendations, relies on periodic inspection, testing, monitoring, and analysis of the criticality design to assure that the required 5% subcriticality margin is maintained.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	C The frequency of the inspection and testing depends on the condition of the Boraflex, with a maximum of five years. Certain accelerated samples are tested every two years. Results based on test coupons have been found to be unreliable in determining the degree to which the actual Boraflex panels have been degraded.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	<p>D This AMP includes performing neutron attenuation testing, called blackness testing, to determine gap formation completing sampling and analysis for silica levels in the spent fuel pool water and trending the results by using the EPRI RACKLIFE predictive code or its equivalent on a monthly, quarterly, or annual basis (depending on Boraflex panel condition) measuring boron areal density by techniques such as the BADGER device.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
1. Scope of Program	<p>A The AMP manages the effects of aging on sheets of neutron-absorbing materials affixed to spent fuel racks.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
2. Preventive Actions:	<p>A For Boraflex panels, monitoring silica levels in the storage pool water, measuring gap formation by blackness testing, periodically measuring boron areal density, and applying predictive codes, are performed.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
3. Parameters Monitored/Inspected:	<p>A The parameters monitored include physical conditions of the Boraflex panels, such as gap formation and decreased boron areal density, and the concentration of the silica in the spent fuel pool.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B As indicated in the Nuclear Regulatory Commission (NRC) Information Notice (IN) 95-38 and NRC Generic Letter (GL) 96-04, the loss of boron carbide (washout) from Boraflex is characterized by slow dissolution of silica from the surface of the Boraflex and a gradual thinning of the material.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

4. Detection of Aging Effects:	A The amount of boron carbide released from the Boraflex panel is determined through direct measurement of boron areal density and correlated with the levels of silica present through the use of a predictive code.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B This is supplemented with detection of gaps through blackness testing and periodic verification of boron loss through areal density measurement techniques such as the BADGER device	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
5. Monitoring and Trending:	A The periodic inspection measurements and analysis are to be compared to values of previous measurements and analysis to provide a continuing level of data for trend analysis.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A The 5% subcriticality margin of the spent fuel racks is to be maintained for the period of extended operation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	A Corrective actions are initiated if the test results find that the 5% subcriticality margin cannot be maintained because of the current or projected future degradation. Corrective actions consist of providing additional neutron-absorbing capacity by Boral or boron steel inserts, or other options, which are available to maintain a subcriticality margin of 5%.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timelessness, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timelessness, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A The NRC IN 87-43 addresses the problems of development of tears and gaps (average 1-2 in., with the largest 4 in.) in Boraflex sheets due to gamma radiation-induced shrinkage of the material. The NRC INs 93-70 and 95-38 and NRC GL 96-04 address several cases of significant degradation of Boraflex test coupons due to accelerated dissolution of Boraflex caused by pool water flow through panel enclosures and high accumulated gamma dose. Two spent fuel rack cells with about 12 years of service have only 40% of the Boraflex remaining. In such cases, the Boraflex may be replaced by boron steel inserts or by a completely new rack system using Boral. Experience with boron steel is limited; however, the application of Boral for use in the spent fuel storage racks predates the manufacturing and use of Boraflex. The experience with Boraflex panels indicates that coupon surveillance programs are not reliable, therefore, measurement of boron areal density correlated, through a predictive code, with silica levels in the pool water and verified periodically, is performed during the period of extended operation. These monitoring programs provide assurance that degradation of Boraflex sheets is monitored, so that appropriate actions can be taken in a timely manner if significant loss of neutron-absorbing capability is occurring. These monitoring programs ensure that the Boraflex sheets</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

	will maintain their integrity and will be effective in performing its intended function.	
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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

REVIEWER: _____

DATE: _____

GALL AMP: XI.M23 Inspection of Overhead Heavy Load and Light Load

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The program demonstrates that testing and monitoring programs have been implemented and have ensured that the structures, systems, and components of these cranes are capable of sustaining their rated loads. This is their intended function during the period of extended operation. It is noted that many of the systems and components of these cranes perform an intended function with moving parts or with a change in configuration, or subject to replacement based on qualified life. In these instances, these types of crane systems and components are not within the scope of this aging management program (AMP). This program is primarily concerned with structural components that make up the bridge and trolley. NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," provides specific guidance on the control of overhead heavy load cranes.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
1. Scope of Program	A The program manages the effects of general corrosion on the crane and trolley structural components for those cranes that are within the scope of 10 CFR 54.4, and the effects of wear on the rails in the rail system.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
2. Preventive Actions:	A No preventive actions are identified. The crane program is an inspection program.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

3. Parameters Monitored/Inspected:	A The program evaluates the effectiveness of the maintenance monitoring program and the effects of past and future usage on the structural reliability of cranes.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The number and magnitude of lifts made by the crane are also reviewed.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A Crane rails and structural components are visually inspected on a routine basis for degradation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Functional tests are also performed to assure their integrity.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
5. Monitoring and Trending:	A Monitoring and trending are not required as part of the crane inspection program.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

6. Acceptance Criteria:	A Any significant visual indication of loss of material due to corrosion or wear is evaluated according to applicable industry standards and good industry practice.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The crane may also have been designed to a specific Service Class as defined in the EOCI Specification #61 (or later revisions), or CMAA Specification #70 (or later revisions), or CMAA Specification #74 (or later revisions). The specification that was applicable at the time the crane was manufactured is used.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM. The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timelessness, root cause determination, and prevention of recurrence.	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:
8. Confirmation Process:	The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM. The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timelessness, root cause determination, and prevention of recurrence.	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A Because of the requirements for monitoring the effectiveness of maintenance at nuclear power plants provided in 10 CFR 50.65, there has been no history of corrosion-related degradation that has impaired cranes. Likewise, because cranes have not been operated beyond their design lifetime, there have been no significant fatigue-related structural failures.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.M24 Compressed Air Monitoring

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The program consists of inspection, monitoring, and testing of the entire system, including (a) frequent leak testing of valves, piping, and other system components, especially those made of carbon steel and stainless steel; and (b) preventive monitoring that checks air quality at various locations in the system to ensure that oil, water, rust, dirt, and other contaminants are kept within the specified limits.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The aging management program (AMP) provides for timely corrective actions to ensure that the system is operating within specified limits.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
1. Scope of Program	A The program manages the effects of corrosion and the presence of unacceptable levels of contaminants on the intended function of the compressed air system. The AMP includes frequent leak testing of valves, piping, and other system components, especially those made of carbon steel	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	B The AMP includes frequent leak testing of valves, piping, and other system components, especially those made of carbon steel and stainless steel.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C a preventive maintenance program to check air quality at several locations in the system.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
2. Preventive Actions:	A The system air quality is monitored and maintained in accordance with the plant owner's testing and inspection plans	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B These requirements are prepared from consideration of manufacturer's recommendations for individual components and guidelines based on ASME OM-S/G-1998, Part 17; ISA-S7.0.01-1996; EPRI NP-7079; and EPRI TR-108147.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C The preventive maintenance program addresses various aspects of the inoperability of air-operated components due to corrosion and the presence of oil, water, rust, and other contaminants.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

3. Parameters Monitored/Inspected:	A Inservice inspection (ISI) and testing is performed to verify proper air quality and confirm that maintenance practices, emergency procedures, and training are adequate to ensure that the intended function of the air system is maintained.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A Guidelines in EPRI NP-7079, EPRI TR-108147, and ASME OM-S/G-1998, Part 17, ensure timely detection of degradation of the compressed air system function.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Degradation of the piping and any equipment would become evident by observation of excessive corrosion, by the discovery of unacceptable leakage rates, and by failure of the system or any item of equipment to meet specified performance limits	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
5. Monitoring and Trending:	A Effects of corrosion and the presence of contaminants are monitored by visual inspection and periodic system and component tests, including leak rate tests on the system and on individual items of equipment. These tests verify proper operation by comparing measured values of performance with specified performance limits.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Test data are analyzed and compared to data from previous tests to provide for timely detection of aging effects.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

6. Acceptance Criteria:	A Acceptance criteria are established for the system and for individual equipment that contain specific limits or acceptance ranges based on design basis conditions and/or equipment vendor specifications.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The testing results are analyzed to verify that the design and performance of the system is in accordance with its intended function.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM. The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timelessness, root cause determination, and prevention of recurrence.	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:
8. Confirmation Process:	The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM. The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timelessness, root cause determination, and prevention of recurrence.	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A Potentially significant safety-related problems pertaining to air systems have been documented in NRC IN 81-38, IN 87-28, IN 87-28 S1 and license event report (LER) 50-237/94-005-3. Some of the systems that have been significantly degraded or have failed due to the problems in the air system include the decay heat removal, auxiliary feedwater, main steam isolation, containment isolation, and fuel pool seal system. As a result of NRC GL 88-14 and consideration of INPO SOER 88-01, EPRI NP-7079, and EPRI TR-108147, performance of air systems has improved significantly.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

EXCEPTIONS

Item Number	Program Elements	LRA Exception Description	Basis for Accepting Exception	Documents Reviewed (Identifier, Para.# and/or Page #)
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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.M25 BWR Reactor Water Cleanup System

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The program includes inservice inspection (ISI) and monitoring and control of reactor coolant water chemistry to manage the effects of stress corrosion cracking (SCC) or intergranular stress corrosion cracking (IGSCC) on the intended function of austenitic stainless steel (SS) piping in the reactor water cleanup (RWCU) system. Based on the Nuclear Regulatory Commission (NRC) criteria related to inspection guidelines for RWCU piping welds outboard of the second isolation valve,	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B the program includes the measures delineated in NUREG-0313, Rev. 2, and NRC Generic Letter(GL) 88-01.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Coolant water chemistry is monitored and maintained in accordance with the Electric Power Research Institute (EPRI) guidelines in boiling water reactor vessel and internals project (BWRVIP)-29 (TR-103515) to minimize the potential of cracking due to SCC or IGSCC.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment

1. Scope of Program	<p>A the program includes the measures delineated in NUREG-0313, Rev. 2, and NRC GL 88-01 to monitor SCC or IGSCC and its effects on the intended function of austenitic SS piping. The screening criteria include:</p> <ul style="list-style-type: none"> a. Satisfactory completion of all actions requested in NRC GL 89-10, b. No detection of IGSCC in RWCU welds inboard of the second isolation valves (ongoing inspection in accordance with the guidance in NRC GL 88-01), and c. No detection of IGSCC in RWCU welds outboard of the second isolation valves after inspecting a minimum of 10% of the susceptible piping. <p>No IGSCC Inspection is recommended for plants that meet all three criteria or that meet criterion (a) and piping is made of material that is resistant to IGSCC.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment</p>
2. Preventive Actions:	<p>A resistant materials are used for new and replacement components and include low-carbon grades of austenitic SS and weld metal, with a maximum carbon of 0.035 wt.% and a minimum ferrite of 7.5% in weld metal and cast austenitic stainless steel (CASS).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>“</p>	<p>B Inconel 82 is the only commonly used nickel-base weld metal considered to be resistant to SCC; other nickel-alloys, such as Alloy 600, are evaluated on an individual basis.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>“</p>	<p>C Special processes are used for existing as well as new and replacement components. These processes include solution heat treatment, heat sink welding, induction heating, and mechanical stress improvement.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	<p>D The program delineated in NUREG-0313 and NRC GL 88-01 varies depending on the plant- specific reactor water chemistry to mitigate SCC or IGSCC.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>3. Parameters Monitored/Inspected:</p>	<p>A The aging management program (AMP) monitors SCC or IGSCC of austenitic SS piping by detection and sizing of cracks by implementing the inspection guidelines delineated in the NRC screening criteria for the RWCU piping outboard of isolation valves. The following schedules are followed:</p> <p>Schedule A: No inspection is required for plants that meet all three criteria set forth above, or if they meet only criterion (a). Piping is made of material that is resistant to IGSCC, as described above in preventive actions.</p> <p>Schedule B: For plants that meet only criterion (a): Inspect at least 2% of the welds or two welds every refueling outage, whichever sample is larger.</p> <p>Schedule C: For plants that do not meet criterion (a): Inspect at least 10% of the welds every refueling outage.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>4. Detection of Aging Effects:</p>	<p>A Guidelines for the inspection schedule, methods, personnel, sample expansion, and leak detection guidelines are based on the guidelines of NRC GL 88-01.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B The NRC GL 88-01 recommends that the detailed inspection procedure, equipment, and examination personnel be qualified by a formal program approved by the NRC. Inspection can reveal crack initiation and growth and leakage of coolant.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	<p>C The extent and frequency of inspections recommended by the program are based on the condition of each weld (e.g., whether the weldments were made from IGSCC-resistant material, whether a stress improvement process was applied to a weldment to reduce the residual stresses, and how the weld was repaired if it had been cracked).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
5. Monitoring and Trending:	<p>A The extent and schedule for inspection in accordance with the recommendations of NRC GL 88-01 provide timely detection of cracks and leakage of coolant.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B Based on inspection results, NRC GL 88-01 provides guidelines for additional samples of welds to be inspected when one or more cracked welds are found in a weld category.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
6. Acceptance Criteria:	<p>A NRC GL 88-01 recommends that any indication detected be evaluated in accordance with the requirements of ASME Section XI, Subsection IWB-3640 (2001 edition including the 2002 and 2003 Addenda).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
7. Corrective Actions:	<p>A The guidance for weld overlay repair, stress improvement, or replacement is provided in NRC GL 88-01.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A The IGSCC has occurred in small- and large-diameter boiling water reactor (BWR) piping made of austenitic SSs or nickel alloys. The comprehensive program outlined in NRC GL 88-01 and NUREG-0313 addresses improvements in all elements that cause SCC or IGSCC (e.g., susceptible material, significant tensile stress, and an aggressive environment) and is effective in managing IGSCC in austenitic SS piping in the RWCU system.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

EXCEPTIONS

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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.M26 Fire Protection

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A For operating plants, the fire protection aging management program (AMP) includes a fire barrier inspection program and a diesel-driven fire pump inspection program. The fire barrier inspection program requires periodic visual inspection of fire barrier penetration seals, fire barrier walls, ceilings, and floors, and periodic visual inspection and functional tests of fire rated doors to ensure that their operability is maintained. The diesel-driven fire pump inspection program requires that the pump be periodically tested to ensure that the fuel supply line can perform the intended function. The AMP also includes periodic inspection and test of halon/carbon dioxide fire suppression system.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	B The AMP also includes periodic inspection and test of halon/carbon dioxide fire suppression system.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
1. Scope of Program	A the AMP manages the aging effects on the intended function of the penetration seals, fire barrier walls, ceilings, and floors, and all fire rated doors (automatic or manual) that perform a fire barrier function. It also manages the aging effects on the intended function of the fuel supply line. The AMP also includes management of the aging effects on the intended function of the halon/carbon dioxide fire suppression system.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment</p>

“	B It also manages the aging effects on the intended function of the fuel supply line.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
“	C The AMP also includes management of the aging effects on the intended function of the halon/carbon dioxide fire suppression system.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
2. Preventive Actions:	A the fire hazard analysis assesses the fire potential and fire hazard in all plant areas	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B It also specifies measures for fire prevention, fire detection, fire suppression, and fire containment and alternative shutdown capability for each fire area containing structures, systems, and components important to safety.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/Inspected:	A Visual inspection of approximately 10% of each type of penetration seal is performed during walkdowns carried out at least once every refueling outage.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B These inspections examine any sign of degradation such as cracking, seal separation from walls and components, separation of layers of material, rupture and puncture of seals, which are directly caused by increased hardness, and shrinkage of seal material due to weathering.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	C Hollow metal fire doors are visually inspected on a plant specific interval to verify the integrity of door surfaces and for clearances.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	D The plant specific inspection intervals are to be determined by engineering evaluation to detect degradation of the fire doors prior to the loss of intended function.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	E The diesel-driven fire pump is under observation during performance tests such as flow and discharge tests, sequential starting capability tests, and controller function tests for detecting any degradation of the fuel supply line.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	F Periodic visual inspection and function test at least once every six months examines the signs of degradation of the halon/carbon dioxide fire suppression system. Material conditions that may affect the performance of the system, such as corrosion, mechanical damage, or damage to dampers, are observed during these tests.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A Visual inspection of penetration seals detects cracking, seal separation from walls and components, and rupture and puncture of seals.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	<p>B Visual inspection by fire protection qualified inspectors of approximately 10% of each type of seal in walkdowns is performed at least once every refueling cycle. If any sign of degradation is detected within that sample, the scope of the inspection is expanded to include additional seals.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>C Visual inspection by fire protection qualified inspectors of the fire barrier walls, ceilings, and floors, performed in walkdowns at least once every refueling outage ensures timely detection of concrete cracking, spalling, and loss of material.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>D Visual inspection by fire protection qualified inspectors detects any sign of degradation of the fire door such as wear and missing parts. The performance tests detect degradation of the fuel supply lines before the loss of the component intended function.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>E Periodic tests performed at least once every refueling outage, such as flow and discharge tests, sequential starting capability tests, and controller function tests performed on diesel-driven fire pump ensure fuel supply line performance.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	<p>F Visual inspections of the halon/CO₂ fire suppression system detect any sign of added degradation, such as corrosion, mechanical damage, or damage to dampers. The periodic function test and inspection performed at least once every six months detects degradation of the halon/CO₂ fire suppression system before the loss of the component intended function. The monthly inspection ensures that the extinguishing agent supply valves are open and the system is in automatic mode.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>G In the test of the halon/carbon dioxide fire suppression system, the suppression agent charge pressure is verified to be within in the normal band.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
5. Monitoring and Trending:	<p>A The aging effects of weathering on fire barrier penetration seals are detectable by visual inspection and, based on operating experience, visual inspections are performed at least once every refueling outage to detect any sign of degradation of fire barrier penetration seals prior to loss of the intended function.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B Concrete cracking, spalling, and loss of material are detectable by visual inspection and, based on operating experience, visual inspection performed at least once every refueling outage detects any sign of degradation of the fire barrier walls, ceilings, and floors before there is a loss of the intended function.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>C Based on operating experience, degraded integrity or clearances in the fire door are detectable by visual inspection performed on a plant specific frequency. The visual inspections detect degradation of the fire doors prior to loss of the intended function.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	D The performance of the fire pump is monitored during the periodic test to detect any degradation in the fuel supply lines. Periodic testing provides data (e.g., pressure) for trending necessary.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	E The performance of the halon/carbon dioxide fire suppression system is monitored during the periodic test to detect any degradation in the system. These periodic tests provide data necessary for trending.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A Inspection results are acceptable if there are no visual Indications of cracking, separation of seals from walls and components, separation of layers of material, or ruptures or punctures of seals, no visual indications of concrete cracking, spalling and loss of material of fire barrier walls, ceilings, and floors, no visual indications of missing parts, holes, and wear and no deficiencies in the functional tests of fire doors.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B No corrosion is acceptable in the fuel supply line for diesel-driven fire pump.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C any signs of corrosion and mechanical damage of the halon/carbon dioxide fire suppression system are not acceptable.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

7. Corrective Actions:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>

10. Operating Experience:	<p>A Silicone foam fire barrier penetration seals have experienced splits, shrinkage, voids, lack of fill, and other failure modes (IN 88-56, IN 94-28, and IN 97-70). Degradation of electrical racing way fire barrier such as small holes, cracking, and unfilled seals are found on routine walkdown (IN 91-47 and GL 92-08). Fire doors have experienced wear of the hinges and handles. Operating experience with the use of this AMP has shown that no corrosion-related problem has been reported for the fuel supply line, pump casing of the diesel-driven fire pump, and the halon/carbon dioxide suppression system.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.M27 Fire Water System

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The aging management program applies to water-based fire protection systems that consist of sprinklers, nozzles, fittings, valves, hydrants, hose stations, standpipes, water storage tanks, and aboveground and underground piping and components that are tested in accordance with the applicable National Fire Protection Association (NFPA) codes and standards. Such testing assures the minimum functionality of the systems. Also, these systems are normally maintained at required operating pressure and monitored such that loss of system pressure is immediately detected and corrective actions initiated.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B A sample of sprinkler heads is to be inspected by using the guidance of NFPA 25 “Inspection, Testing and Maintenance of Water-Based Fire Protection Systems” (1998 Edition), Section 2-3.1.1, or NFPA 25 (2002 Edition), Section 5.3.1.1.1. This NFPA section states “where sprinklers have been in place for 50 years, they shall be replaced or representative samples from one or more sample areas shall be submitted to a recognized testing laboratory for field service testing.” It also contains guidance to perform this sampling every 10 years after the initial field service testing.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	C The fire protection system piping is to be subjected to required flow testing in accordance with guidance in NFPA 25 to verify design pressure or evaluated for wall thickness (e.g., nonintrusive volumetric testing or plant maintenance visual inspections) to ensure that aging effects are managed and that wall thickness is within acceptable limits.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	D These inspections are performed before the end of the current operating term and at plant-specific intervals thereafter during the period of extended operation. The plant-specific inspection intervals are to be determined by engineering evaluation of the fire protection piping to ensure that degradation will be detected before the loss of intended function.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	E The purpose of the full flow testing and wall thickness evaluations is to ensure that corrosion, MIC, or biofouling is managed such that the system function is maintained.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
1. Scope of Program	A The AMP focuses on managing loss of material due to corrosion, MIC, or biofouling of carbon steel and cast-iron components in fire protection systems exposed to water.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
“	B Hose station and standpipe are considered as piping in the AMP.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

2. Preventive Actions:	A To ensure no significant corrosion, MIC, or biofouling has occurred in water-based fire protection systems, periodic flushing, system performance testing, and inspections are conducted.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/Inspected:	A The parameters monitored are the system's ability to maintain pressure and internal system corrosion conditions. Periodic flow testing of the fire water system is performed using the guidelines of NFPA 25, or wall thickness evaluations may be performed to ensure that the system maintains its intended function.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A Fire protection system testing is performed to assure that the system functions by maintaining required operating pressures.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Wall thickness evaluations of fire protection piping are performed on system components using nonintrusive techniques (e.g., volumetric testing) to identify evidence of loss of material due to corrosion.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	<p>C These inspections are performed before the end of the current operating term and at plant-specific intervals thereafter during the period of extended operation. As an alternative to non-intrusive testing, the plant maintenance process may include a visual inspection of the internal surface of the fire protection piping upon each entry to the system for routine or corrective maintenance, as long as it can be demonstrated that inspections are performed (based on past maintenance history) on a representative number of locations on a reasonable basis.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>D These inspections must be capable of evaluating (1) wall thickness to ensure against catastrophic failure and (2) the inner diameter of the piping as it applies to the design flow of the fire protection system.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>E If the environmental and material conditions that exist on the interior surface of the below grade fire protection piping are similar to the conditions that exist within the above grade fire protection piping, the results of the inspections of the above grade fire protection piping can be extrapolated to evaluate the condition of below grade fire protection piping. If not, additional inspection activities are needed to ensure that the intended function of below grade fire protection piping will be maintained consistent with the current licensing basis for the period of extended operation. Continuous system pressure monitoring, system flow testing, and wall thickness evaluations of piping are effective means to ensure that corrosion and biofouling are not occurring and the system's intended function is maintained.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	F General requirements of existing fire protection programs include testing and maintenance of fire detection and suppression systems and surveillance procedures to ensure that fire detectors, as well as fire suppression systems and components, are operable.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	G Visual inspection of yard fire hydrants performed once every six months ensures timely detection of signs of degradation, such as corrosion. Fire hydrant hose hydrostatic tests, gasket inspections, and fire hydrant flow tests, performed annually, ensure that fire hydrants can perform their intended function and provide of intended function can occur.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	H Sprinkler systems are inspected once every refueling outage to ensure that signs of degradation, such as corrosion, are detected in a timely manner.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
5. Monitoring and Trending:	A System discharge pressure is monitored continuously.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Results of system performance testing are monitored and trended as specified by the NFPA codes and standards.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	C Degradation identified by internal inspection is evaluated.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A The acceptance criteria are the ability of a fire protection system to maintain required pressure, no unacceptable signs of degradation observed during visual assessment of internal system conditions, and that no biofouling exists in the sprinkler systems that could cause corrosion in the sprinkler heads.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM. The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:
8. Confirmation Process:	The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM. The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:
9. Administrative Controls:	The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM. The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

	technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.	
10. Operating Experience:	A Water-based fire protection systems designed, inspected, tested and maintained in accordance with the NFPA minimum standards have demonstrated reliable performance.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.M29 Aboveground Steel Tanks

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The program includes preventive measures to mitigate corrosion by protecting the external surface of steel tanks with paint or coatings in accordance with standard industry practice. The program also relies on periodic system walkdowns to monitor degradation of the protective paint or coating	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B for storage tanks supported on earthen or concrete foundations, corrosion may occur at inaccessible locations, such as the tank bottom. Accordingly, verification of the effectiveness of the program is to be performed to ensure that significant degradation in inaccessible locations is not occurring and the component intended function will be maintained during the extended period of operation. For reasons set forth below, an acceptable verification program consists of thickness measurement of the tank bottom surface.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
1. Scope of Program	A The program consists of preventive measures to mitigate corrosion by protecting the external surfaces of carbon steel tanks protected with paint or coatings and periodic system walkdowns to manage the effects of corrosion on the intended function of these tanks. Plant walkdowns cover the entire outer surface of the tank up to its surface in contact with soil or concrete.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment

2. Preventive Actions:	A In accordance with industry practice, tanks are coated with protective paint or coating to mitigate corrosion by protecting the external surface of the tank from environmental exposure.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
	B Sealant or caulking at the interface edge between the tank and concrete or earthen foundation mitigates corrosion of the bottom surface of the tank by preventing water and moisture from penetrating the interface, which would lead to corrosion of the bottom surface.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/Inspected:	A The aging management program (AMP) utilizes periodic plant system walkdowns to monitor degradation because it is a condition directly related to the potential loss of materials.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A Periodic system walkdowns to confirm that the paint, coating, sealant, and caulking are intact is an effective method to manage the effects of corrosion on the external surface of the component.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B corrosion may occur at inaccessible locations, such as the tank bottom surface, and thickness measurement of the tank bottom is to be taken to ensure that significant degradation is not occurring and the component intended function will be maintained during the extended period of operation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

5. Monitoring and Trending:	<p>A The effects of corrosion of the aboveground external surface are detectable by visual techniques. Based on operating experience, plant system walkdowns during each outage provide for timely detection of aging effects.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B The effects of corrosion of the underground external surface are detectable by thickness measurement of the tank bottom and are monitored and trended if significant material loss is detected.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
6. Acceptance Criteria:	<p>A Any degradation of paint, coating, sealant, and caulking is reported and will require further evaluation. Degradation consists of cracking, flaking, or peeling of paint or coatings, and drying, cracking or missing sealant and caulking.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B Thickness measurements of the tank bottom are evaluated against the design thickness and corrosion allowance.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
7. Corrective Actions:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>

8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A Coating degradation has occurred in safety-related systems and structures (Nuclear Regulatory Commission [NRC] Generic Letter [GL] 98-04). Corrosion damage near the concrete-metal interface and sand-metal interface has been reported in metal containments (NRC Information Notice [IN] 89-79, Supplement 1, and NRC IN 86-99, Supplement 1).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

REVIEWER: _____

DATE: _____

GALL AMP: XI.M30 Fuel Oil Chemistry

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The program includes (a) surveillance and maintenance procedures to mitigate corrosion and (b) measures to verify the effectiveness of an aging management program (AMP) and confirm the absence of an aging affect.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Fuel oil quality is maintained by monitoring and controlling fuel oil contamination in accordance with plant's technical specification and the guidelines of the American Society for Testing Materials (ASTM) Standards D 1796, D 2276, D 2709, D 6217, and D 4057.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Exposure to fuel oil contaminants, such as water and microbiological organisms, is minimized by periodic draining or cleaning of tanks and by verifying the quality of new oil before its introduction into the storage tanks.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	D The effectiveness of the program is verified to ensure that significant degradation is not occurring and the component's intended function will be maintained during the extended period of operation. Thickness measurement of tank bottom surfaces is an acceptable verification program.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

1. Scope of Program	A The program is focused on managing the conditions that cause general, pitting, and microbiologically-influence corrosion (MIC) of the diesel fuel tank internal surfaces in accordance with the plant's technical specifications (i.e., NUREG-1430, NUREG-1431, NUREG-1432, NUREG-1433) on fuel oil purity and the guidelines of ASTM Standards D1796, D2276, D2709, D6217, and D4057. The program serves to reduce the potential of exposure of the tank internal surface to fuel oil contaminated with water and microbiological organisms.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
2. Preventive Actions:	A The quality of fuel oil is maintained by additions of biocides to minimize biological activity, stabilizers to prevent biological breakdown of the diesel fuel, and corrosion inhibitors to mitigate corrosion. One-time inspection is an inspection activity independent of methods to mitigate or prevent degradation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Periodic cleaning of a tank allows removal of sediments	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Periodic draining of water collected at the bottom of a tank minimizes the amount of water and the length of contact time.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/Inspected:	A The AMP monitors fuel oil quality and the levels of water and microbiological organisms in the fuel oil	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	B The ASTM Standard D 4057 is used for guidance on oil sampling.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C The ASTM Standards D 1796 and D 2709 are used for determination of water and sediment contamination in diesel fuel.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	D For determination of particulates, modified ASTM D 2276, Method A, is used.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A Internal surfaces of tanks <u>that</u> are drained <u>for cleaning</u> are visually inspected to detect potential degradation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B However, corrosion may occur at locations in which contaminants may accumulate, such as a tank bottom, and an ultrasonic thickness measurement of the tank bottom surface ensures that significant degradation is not occurring.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

5. Monitoring and Trending:	A Water and biological activity or particulate contamination concentrations are monitored and trended in accordance with the plant's technical specifications or at least quarterly. Based on industry operating experience, quarterly sampling and analysis of fuel oil provide for timely detection of conditions conducive to corrosion of the internal surface of the diesel fuel oil tank before the potential loss of its intended function.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
6. Acceptance Criteria:	A The ASTM Standard D 4057 is used for guidance on oil sampling.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	B The ASTM Standards D 1796 and D 2079 are used for guidance on the determination of water and sediment contamination in diesel fuel.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	C ASTM D 6217 and Modified D 2276, Method A are used for guidance for determination of particulates. The modification to D 2276 consists of using a filter with a pore size of 3.0 µm, instead of 0.8 µm.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
7. Corrective Actions:	A Also, when the presence of biological activity is confirmed, a biocide is added to fuel oil.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A The operating experience at some plants has included identification of water in the fuel, particulate contamination, and biological fouling. However, no instances of fuel oil system component failures attributed to contamination have been identified.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

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Item Number	Program Elements	LRA Enhancement Description	Basis for Accepting Enhancement	Documents Reviewed (Identifier, Para.# and/or Page #)
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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.M32 One-Time Inspection

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The program includes measures to verify the effectiveness of an aging management program (AMP) and confirm the absence of an aging effect. Situations in which additional confirmation is appropriate include (a) an aging effect is not expected to occur but the data is insufficient to rule it out with reasonable confidence; (b) an aging effect is expected to progress very slowly in the specified environment, but the local environment may be more adverse than that generally expected; or (c) the characteristics of the aging effect include a long incubation period.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B The elements of the program include (a) determination of the sample size based on an assessment of materials of fabrication, environment, plausible aging effects, and operating experience; (b) identification of the inspection locations in the system or component based on the aging effect; (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect for which the component is examined; and (d) evaluation of the need for follow-up examinations to monitor the progression of aging if age-related degradation is found that could jeopardize an intended function before the end of the period of extended operation. When evidence of an aging effect is revealed by a one-time inspection, the routine evaluation of the inspection results would identify appropriate corrective actions.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	<p>C As set forth below, an acceptable verification program may consist of a one-time inspection of selected components and susceptible locations in the system. An alternative acceptable program may include routine maintenance or a review of repair or inspection records to confirm that these components have been inspected for aging degradation and significant aging degradation has not occurred.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
1. Scope of Program	<p>A The program includes measures to verify that unacceptable degradation is not occurring, thereby validating the effectiveness of existing AMPs or confirming that there is no need to manage aging-related degradation for the period of extended operation.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B The structures and components for which one-time inspection is to verify the effectiveness of the AMPs (e.g., water chemistry control, etc.) have been identified in the Generic Aging Lessons Learned (GALL) report.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
2. Preventive Actions:	<p>A One-time inspection is an inspection activity independent of methods to mitigate or prevent degradation.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
3. Parameters Monitored/Inspected:	<p>A The program monitors parameters directly related to the degradation of a component.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	B Inspection is performed in accordance with the requirements of the American Society of Mechanical Engineers (ASME) Code and 10 CFR 50, Appendix B, by using a variety of nondestructive examination (NDE) methods, including visual, volumetric, and surface techniques.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A The inspection includes a representative sample of the system population, and, where practical, focus on the bounding or lead components most susceptible to aging due to time in service, severity of operating conditions, and lowest design margin.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The program will rely on established NDE techniques, including visual, ultrasonic, and surface techniques that are performed by qualified personnel following procedures consistent with the ASME Code and 10 CFR Part 50, Appendix B.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Reference to the Table which is “Examples of Parameters Monitored or Inspected and Aging Effect for Specific Structure or Component”	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	D the population of components inspected before the end of the current operating term needs to be sufficient to provide reasonable assurance that the aging effect will not compromise any intended function at any time during the period of extended operation	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	E Specifically, inspections need to be completed early enough to ensure that the aging effects that may affect intended functions early in the period of extended operation are appropriately managed.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	F inspections need to be timed to allow the inspected components to attain sufficient age to ensure that the aging effects with long incubation periods	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	G the applicant should schedule the inspection no earlier than 10 years prior to the period of extended operation, and in such a way as to minimize the impact on plant operations. As a plant will have accumulated at least 30 years of use before inspections under this program begin, sufficient times will have elapsed for aging effects, if any, to be manifest.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
5. Monitoring and Trending:	A One-time inspection does not provide specific guidance on monitoring and trending.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B evaluation of the appropriateness of the techniques and timing of the one-time inspection improve with the accumulation of plant-specific and industry-wide experience.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

6. Acceptance Criteria:	A Any indication or relevant conditions of degradation detected are evaluated..	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The ultrasonic thickness measurements are to be compared to predetermined limits, such as design minimum wall thickness	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:
8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A The elements that comprise these inspections (e.g., the scope of the inspections and inspection techniques) are consistent with years of industry practice and staff expectations.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

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Item Number	Program Elements	LRA Exception Description	Basis for Accepting Exception	Documents Reviewed (Identifier, Para.# and/or Page #)
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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.M33 Selective Leaching of Materials

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The program for selective leaching of materials ensures the integrity of the components made of cast iron, bronze, brass, and other alloys exposed to a raw water, brackish water, treated water, or groundwater environment that may lead to selective leaching of one of the metal components.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The aging management program (AMP) a one-time visual inspection and hardness measurement of selected components that may be susceptible to selective leaching to determine whether loss of materials due to selective leaching is occurring, and whether the process will affect the ability of the components to perform their intended function for the period of extended operation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
1. Scope of Program	A This AMP determines the acceptability of the components that may be susceptible to selective leaching and assess their ability to perform the intended function during the period of extended operation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	B These components include piping, valve bodies, and bonnets, pump casing, and heat exchanger components.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C The materials of construction for these components may include cast iron, brass, bronze, or aluminum-bronze.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	D These components may be exposed to a raw water, treated water, or groundwater environment.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	E The AMP includes a one-time hardness measurement of a selected set of components to determine whether loss of material due to selective leaching is not occurring for the period of extended operation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
2. Preventive Actions:	A The one-time visual inspection and hardness measurement is an inspection/verification program; thus, there is no preventive action.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

3. Parameters Monitored/Inspected:	A The visual inspection and hardness measurement is to be a one-time inspection.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Because selective leaching is a slow acting corrosion process, this measurement is performed just before the beginning of the license renewal period. Follow-up of unacceptable inspection findings includes expansion of the inspection sample size and location.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A The one-time visual inspection and hardness measurement includes close examination of a select set of components to determine whether selective leaching has occurred and whether the resulting loss of strength and/or material will affect the intended functions of these components during the period of extended operation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B One acceptable procedure is to visually inspect the susceptible components closely and conduct Brinell Hardness testing on the inside surfaces of the selected set of components to determine if selective leaching has occurred.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C If it is occurring, an engineering evaluation is initiated to determine acceptability of the affected components for further service.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

5. Monitoring and Trending:	A There is no monitoring and trending inspection and hardness measurement.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A Identification of selective leaching will define the need for further engineering evaluation before the affected components can be qualified for further service. If necessary, the evaluation will include a root cause analysis.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM. The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:
8. Confirmation Process:	The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM. The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:
9. Administrative Controls:	The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM. The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

	documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.	
10. Operating Experience:	A One-time inspection is a new program to be applied by the applicant. The elements that comprise these inspections (e.g., the scope of the inspections and inspection techniques) are consistent with years of industry practice and staff expectations.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.M34 Buried Piping And Tanks Inspection

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The program includes preventive measures to mitigate corrosion.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B periodic inspection to manage the effects of corrosion on the pressure-retaining capacity of buried carbon steel piping and tanks	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Gray cast iron, which is included under the definition of steel, is also subject to a loss of material due to selective leaching, which is an aging effect managed under Chapter XI.M33,“Selective Leaching of Materials.” Preventive measures are in accordance with standard industry practice for maintaining external coatings and wrappings	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	D Preventive measures are in accordance with standard industry practice for maintaining external coatings and wrappings.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	E Buried piping and tanks are inspected when they are excavated during maintenance and when a pipe is dug up and inspected for any reason.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	F This is an acceptable option to manage buried components, except for the program element/attributes of detection of aging effects (regarding inspection frequency) and operating experience.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
1. Scope of Program	A The program relies on preventive measures such as coating and wrapping and periodic inspection for loss of material caused by corrosion of the external surface of buried steel piping and tanks . Loss of material in these components, which may be exposed to aggressive soil environment, is caused by general, pitting, and crevice corrosion, and microbiologically-influenced corrosion (MIC).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
“	B Periodic inspections are performed when the components are excavated for maintenance or for any other reason.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment
2. Preventive Actions:	A In accordance with industry practice, underground piping and tanks are coated during installation with a protective coating system to protect the piping from contacting the aggressive soil environment. .	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

3. Parameters Monitored/Inspected:	A The program monitors parameters such as coating and wrapping integrity that are directly related to corrosion damage of the external surface of buried steel piping and tanks. Coatings and wrappings are inspected by visual techniques.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Any evidence of damaged wrapping or coating defects is an indicator of possible corrosion damage to the external surface of piping and tanks.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A Inspections performed to confirm that coating and wrapping are intact	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Buried piping and tanks are opportunistically inspected whenever they are excavated during maintenance. When opportunistic, the inspections are performed in areas with the highest likelihood of corrosion problems, and in areas with a history of corrosion problems, within the areas made accessible to support the maintenance activity.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C The applicant's program is to be evaluated for the extended period of operation. It is anticipated that one or more opportunistic inspections may occur within a ten-year period. Prior to entering the period of extended operation, the applicant is to verify that there is at least one opportunistic or focused inspection is performed within the past ten years.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	<p>D Upon entering the period of extended operation, the applicant is to perform a focused inspection within ten years, unless an opportunistic inspection occurred within this ten-year period.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>E Any credited inspection should be performed in areas with the highest likelihood of corrosion problems, and in areas with a history of corrosion problems.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>5. Monitoring and Trending:</p>	<p>A Results of previous inspections are used to identify susceptible locations.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>6. Acceptance Criteria:</p>	<p>A Any coating and wrapping degradations are reported and evaluated according to site corrective actions procedures.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>7. Corrective Actions:</p>	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>

8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A Operating experience shows that the program described here is effective in managing corrosion of external surfaces of buried steel components. However, because the inspection frequency is plant specific and also depends on the plant operating experience, the applicant's plant-specific operating experience is further evaluated for the extended period of operation.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

EXCEPTIONS

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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

REVIEWER: _____

DATE: _____

GALL AMP: XI.S1 ASME Section XI, Subsection IWE

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A The 10 CFR 50.55a imposes the inservice inspection (ISI) requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, Subsection IWE for steel containments (Class MC) and steel liners for concrete containments (Class CC). The full scope of IWE includes steel containment shells and their integral attachments; steel liners for concrete containments and their integral attachments; containment hatches and airlocks; seals, gaskets and moisture barriers; and pressure-retaining bolting. This evaluation covers both the 1992 Edition with the 1992 Addenda and the 1995 Edition with the 1996 Addenda, as approved in 10 CFR 50.55a. ASME Code Section XI, Subsection IWE and the additional requirements specified in 10 CFR 50.55a(b)(2) constitute an existing mandated program applicable to managing aging of steel containments, steel liners of concrete containments, and other containment components for license renewal.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
1. Scope of Program	A Subsection IWE-1000 specifies the components of steel containments and steel liners of concrete containments within its scope. The components within the scope of Subsection IWE are Class MC pressure-retaining components (steel containments) and their integral attachments; metallic shell and penetration liners of Class CC containments and their integral attachments; containment seals and gaskets; containment pressure-retaining bolting; and metal containment surface areas, including welds and base metal.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	<p>B Subsection IWE exempts the following from examination:</p> <ul style="list-style-type: none"> (1) Components that are outside the boundaries of the containment as defined in the plant-specific design specification; (2) Embedded or inaccessible portions of containment components that met the requirements of the original construction code of record; (3) Components that become embedded or inaccessible as a result of vessel repair or replacement, provided IWE-1232 and IWE-5220 are met; and (4) Piping, pumps, and valves that are part of the containment system or that penetrate or are attached to the containment vessel (governed by IWB or IWC). 	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>C The 10 CFR 50.55a(b)(2)(ix) specifies additional requirements for inaccessible areas. It states that the licensee is to evaluate the acceptability of inaccessible areas when conditions exist in accessible areas that could indicate the presence of or result in degradation to such inaccessible areas. Examination requirements for containment supports are not within the scope of Subsection IWE.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
2. Preventive Actions:	<p>A No preventive actions are specified; Subsection IWE is a monitoring program.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
3. Parameters Monitored/Inspected:	<p>A Table IWE-2500-1 specifies seven categories for examination. Table IWE-2500-1 references the applicable section in IWE-3500 that identifies the aging effects that are evaluated. The parameters monitored or inspected depend on the particular examination category.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
4. Detection of Aging Effects:	<p>A The frequency and scope of examination specified in 10 CFR 50.55a and Subsection IWE ensure that aging effects would be detected before they would compromise the design-</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to</p>

	basis requirements.	<p>confirm Criteria:</p> <p>Comment:</p>
5. Monitoring and Trending:	<p>A With the exception of inaccessible areas, all surfaces are monitored by virtue of the examination requirements on a scheduled basis.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B When component examination results require evaluation of flaws, evaluation of areas of degradation, or repairs, and the component is found to be acceptable for continued service, the areas containing such flaws, degradation, or repairs shall be reexamined during the next inspection period, in accordance with Examination Category E-C. When these reexaminations reveal that the flaws, areas of degradation, or repairs remain essentially unchanged for three consecutive inspection periods, these areas no longer require augmented examination in accordance with Examination Category E-C.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>C IWE-2430 specifies that (a) examinations performed during any one inspection that reveal flaws or areas of degradation exceeding the acceptance standards are to be extended to include an additional number of examinations within the same category approximately equal to the initial number of examinations, and (b) when additional flaws or areas of degradation that exceed the acceptance standards are revealed, all of the remaining examinations within the same category are to be performed to the extent specified in Table IWE-2500-1 for the inspection interval.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
	<p>D Alternatives to these examinations are provided in 10 CFR 50.55a(b)(2)(ix)(D).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p>

“		<p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>6. Acceptance Criteria:</p>	<p>A IWE-3000 provides acceptance standards for components of steel containments and liners of concrete containments</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B Table IWE-3410-1 presents criteria to evaluate the acceptability of the containment components for service following the preservice examination and each inservice examination. This table specifies the acceptance standard for each examination category.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>7. Corrective Actions:</p>	<p>A Subsection IWE states that components whose examination results indicate flaws or areas of degradation that do not meet the acceptance standards listed in Table-3410-1 are acceptable if an engineering evaluation indicates that the flaw or area of degradation is nonstructural in nature or has no effect on the structural integrity of the containment. Except as permitted by 10 CFR 50.55a(b)(ix)(D), components that do not meet the acceptance standards are subject to additional examination requirements, and the components are repaired or replaced to the extent necessary to meet the acceptance standards of IWE-3000. For repair of components within the scope of Subsection IWE, IWE-3124 states that repairs and reexaminations are to comply with IWA-4000. IWA-4000 provides repair specifications for pressure retaining components including metal containments and metallic liners of concrete containments.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p>
<p>8. Confirmation Process:</p>	<p>A When areas of degradation are identified, an evaluation is performed to determine whether repair or replacement is necessary. If the evaluation determines that repair or replacement is necessary, Subsection IWE specifies confirmation that appropriate corrective actions have been completed and are effective. Subsection IWE states that repairs and reexaminations are to comply with the requirements of IWA-4000.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p>

		Comment:
“	<p>B Reexaminations are conducted in accordance with the requirements of IWA-2200, and the recorded results are to demonstrate that the repair meets the acceptance standards set forth in Table IWE-3410-1.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timelessness, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A ASME Section XI, Subsection IWE was incorporated into 10 CFR 50.55a in 1996. Prior to this time, operating experience pertaining to degradation of steel components of containment was gained through the inspections required by 10 CFR Part 50, Appendix J and ad hoc inspections conducted by licensees and the Nuclear Regulatory Commission (NRC). NRC Information Notice (INs) 86-99, 88-82 and 89-79 described occurrences of corrosion in steel containment shells. NRC Generic Letter (GL) 87-05 addressed the potential for corrosion of boiling water reactor (BWR) Mark I steel drywells in the “sand pocket region.” More recently, NRC IN 97-10 identified specific locations where concrete containments are susceptible to liner plate corrosion. The program is to consider the liner plate and containment shell corrosion concerns described in these generic communications. Implementation of the ISI requirements of Subsection IWE, in accordance with 10 CFR 50.55a, is a necessary element of aging management for steel components of steel and concrete containments through the period of extended operation.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

REVIEWER: _____

DATE: _____

GALL AMP: XI.S3 ASME Section XI, Subsection IWF

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<p><u>Program Description</u></p>	<p>A The 10 CFR 50.55a imposes the inservice inspection (ISI) requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, for Class 1, 2, 3, and MC piping and components and their associated supports. Inservice inspection of supports for ASME piping and components is addressed in Section XI, Subsection IWF. This evaluation covers the 1989 Edition through the 1995 Edition and addenda through the 1996 Addenda, as approved in 10 CFR 50.55a. ASME Code Section XI, Subsection IWF constitutes an existing mandated program applicable to managing aging of ASME Class 1, 2, 3, and MC supports for license renewal.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>“</p>	<p>B The IWF scope of inspection for supports is based on sampling of the total support population. The sample size varies depending on the ASME Class. The largest sample size is specified for the most critical supports (ASME Class 1). The sample size decreases for the less critical supports (ASME Class 2 and 3). Discovery of support deficiencies during regularly scheduled inspections triggers an increase of the inspection scope, in order to ensure that the full extent of deficiencies is identified. The primary inspection method employed is visual examination. Degradation that potentially compromises support function or load capacity is identified for evaluation. IWF specifies acceptance criteria and corrective actions. Supports requiring corrective actions are re-examined</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

	during the next inspection period.	
1. Scope of Program	<p>A For Class 1 piping and component supports, Subsection IWF (1989 edition) refers to Subsection IWB for the inspection scope and schedule. According to Table IWB-2500-1, only 25% of nonexempt supports are subject to examination. Supports exempt from examination are the supports for piping systems that are exempt from examination, according to pipe diameter or service. The same supports are inspected in each 10-year inspection interval.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B For Class 2, 3, and MC piping and component supports, Subsection IWF (1989 edition) refers to Subsections IWC, IWD, and IWE for the inspection scope and schedule. According to Table IWC-2500-1, 7.5% of nonexempt supports are subject to examination for Class 2 systems. The same supports are inspected in each 10-year inspection interval.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>C No specific numerical percentages are identified in Subsections IWD and IWE for Class 3 and Class MC, respectively.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
2. Preventive Actions:	<p>A No preventive actions are specified; Subsection IWF is a inspection program.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
3. Parameters Monitored/Inspected:	<p>A IWF specifies visual examination (VT-3) of supports. The parameters monitored or inspected include corrosion; deformation; misalignment; improper clearances; improper spring settings; damage to close tolerance machined or sliding surfaces; and missing, detached, or loosened support items. The visual inspection would be expected to identify relatively</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

	large cracks.	
4. Detection of Aging Effects:	A VT-3 visual examination is specified in Table IWF-2500-1. The complete inspection scope is repeated every 10-year inspection interval. The qualified VT-3 inspector uses judgment in assessing general corrosion; observed degradation is documented if loss of structural capacity is suspected.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
5. Monitoring and Trending:	A There is no requirement to monitor or report progressive, time-dependent degradation. Unacceptable conditions, according to IWF-3400, are noted for correction or further evaluation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A The acceptance standards for visual examination are specified in IWF-3400.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	A In accordance with IWF-3122, supports containing unacceptable conditions are evaluated or tested, or corrected before returning to service. Corrective actions are delineated in IWF-3122.2. IWF-3122.3 provides an alternative for evaluation or testing, to substantiate structural integrity and/or functionality.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
8. Confirmation Process:	The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM. The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:

9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No Comment:
10. Operating Experience:	A To date, IWF sampling inspections have been effective in managing aging effects for ASME Class 1, 2, 3, and MC supports. There is reasonable assurance that the Subsection IWF inspection program will be effective through the period of extended operation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

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EXCEPTIONS

Item Number	Program Elements	LRA Exception Description	Basis for Accepting Exception	Documents Reviewed (Identifier, Para.# and/or Page #)
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ENHANCEMENTS

Item Number	Program Elements	LRA Enhancement Description	Basis for Accepting Enhancement	Documents Reviewed (Identifier, Para.# and/or Page #)
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Document Reviewed During Audit:

DOCUMENT NUMBER	IDENTIFIER (NUMBER)	TITLE	REVISION AND/OR DATE
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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.S4 10 CFR Part 50, Appendix J

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	<p>A As described in 10 CFR Part 50, Appendix J, containment leak rate tests are required "to assure that (a) leakage through the primary reactor containment and systems and components penetrating primary containment shall not exceed allowable leakage rate values as specified in the technical specifications or associated bases and (b) periodic surveillance of reactor containment penetrations and isolation valves is performed so that proper maintenance and repairs are made during the service life of the containment, and systems and components penetrating primary containment."Appendix J provides two options, A and B, either of which can be chosen to meet the requirements of a containment LRT program. Under Option A, all of the testing must be performed on a periodic interval. Option B is a performance-based approach. Some of the differences between these options are discussed below, and more detailed information for Option B is provided in the Nuclear Regulatory Commission (NRC) Regulatory Guide (RG) 1.163 and NEI 94-01, Rev. 0.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
1. Scope of Program	<p>A The scope of the containment LRT program includes all pressure-retaining components.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
	<p>B Type A and B tests described in 10 CFR Part 50, Appendix J, are acceptable methods for performing these LRTs.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p>

“		Comment:
“	C Leakage testing for containment isolation valves (normally performed under Type C tests), if not included under this program, is included under LRT programs for systems containing the isolation valves.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
2. Preventive Actions:	A No preventive actions are specified; the containment LRT program is a monitoring program.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/Inspected:	A The parameters to be monitored are leakage rates through containment shells; containment liners; and associated welds, penetrations, fittings, and other access openings.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A A containment LRT program is effective in detecting degradation of containment shells, liners, and components that compromise the containment pressure boundary, including seals and gaskets. While the calculation of leakage rates demonstrates the leak-tightness and structural integrity of the containment, it does not by itself provide information that would indicate that aging degradation has initiated or that the capacity of the containment may have been reduced for other types of loads, such as seismic loading. This would be achieved with the additional implementation of an acceptable containment inservice inspection program as described in XI.S1 and XI.S2.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
5. Monitoring and Trending:	A With Option A, testing is performed on a regular fixed time interval as defined in 10 CFR Part 50, Appendix J.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:

		Comment:
“	B In the case of Option B, the interval for testing may be increased on the basis of acceptable performance in meeting leakage limits in prior tests. Additional details for implementing Option B are provided in NRC Regulatory Guide 1.163 and NEI 94-01, Rev.0.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
6. Acceptance Criteria:	A Acceptance criteria for leakage rates are defined in plant technical specifications.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	B These acceptance criteria meet the requirements in 10 CFR Part 50, Appendix J, and are part of each plant's current licensing basis.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
7. Corrective Actions:	A Corrective actions are taken in accordance with 10 CFR Part 50, Appendix J, and NEI 94-01. When leakage rates do not meet the acceptance criteria, an evaluation is performed to identify the cause of the unacceptable performance, and appropriate corrective actions must be taken.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
8. Confirmation Process:	A When corrective actions are implemented to repair a condition that causes excessive leakage, confirmation by additional leak rate testing is performed to confirm that the deficiency has been corrected.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
9. Administrative Controls:	A Results of the LRT program are documented as described in 10 CFR Part 50, Appendix J, to demonstrate that the acceptance criteria for leakage have been satisfied. The test	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p>

	results that exceed the performance criteria must be assessed under 10 CFR 50.72 and 10 CFR 50.73.	Comment:
10. Operating Experience:	A To date, the 10 CFR Part 50, Appendix J, LRT program has been effective in preventing unacceptable leakage through the containment pressure boundary. Implementation of Option B for testing frequency must be consistent with plant-specific operating experience.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.S5 Masonry Wall Program

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A Nuclear Regulatory Commission (NRC) IE Bulletin (IEB) 80-11, "Masonry Wall Design," and NRC Information Notice (IN) 87-67, "Lessons Learned from Regional Inspections of Licensee Actions in Response to IE Bulletin 80-11," constitute an acceptable basis for a masonry wall aging management program (AMP).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The objective of the masonry wall program is to manage aging effects so that the evaluation basis established for each masonry wall within the scope of license renewal remains valid through the period of extended operation. Since the issuance of NRC IEB 80-11 and NRC IN 87-67, the NRC promulgated 10 CFR 50.65, the Maintenance Rule. <u>Note to reviewer:</u> Since the issuance of NRC IEB 80-11 and NRC IN 87-67, the NRC promulgated 10 CFR 50.65, the Maintenance Rule. Masonry walls may be inspected as part of the Structures Monitoring Program (XI.S6) conducted for the Maintenance Rule, provided the ten attributes described below are incorporated.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Important elements in the evaluation of many masonry walls during the NRC IEB 80-11 program included (1) installation of steel edge supports to provide a sound technical basis for boundary conditions used in seismic analysis and (2) installation of steel bracing to ensure containment of unreinforced masonry walls during a seismic event. Consequently, in addition to the development of cracks in the masonry walls, loss of function of the structural steel supports and bracing would also invalidate the evaluation basis.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

	<p><u>Note to reviewer:</u> See GALL Vol. 2, III.B5. Steel supports for masonry walls are included in the category of miscellaneous structural steel supports. The Structures Monitoring Program is the identified AMP. Reviewer should confirm that the applicant has credited an appropriate AMP to manage aging of steel supports/bracing for masonry walls.</p> <p>How can this be audit?</p>	
1. Scope of Program	<p>A The scope includes all masonry walls identified as performing intended functions in accordance with 10 CFR 54.4.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
2. Preventive Actions:	<p>A No specific preventive actions are required.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
3. Parameters Monitored/Inspected:	<p>A The primary parameter monitored is wall cracking that could potentially invalidate the evaluation basis.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
4. Detection of Aging Effects:	<p>A Visual examination of the masonry walls by qualified inspection personnel is sufficient. The frequency of inspection is selected to ensure there is no loss of intended function between inspections.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

“	B The inspection frequency may vary from wall to wall, depending on the significance of cracking in the evaluation basis.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Unreinforced masonry walls that have not been contained by bracing warrant the most frequent inspection, because the development of cracks may invalidate the existing evaluation basis.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
5. Monitoring and Trending:	A Trending is not required. Monitoring is achieved by periodic examination for cracking.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A For each masonry wall, the extent of observed cracking of masonry and degradation of steel edge supports and bracing is not to invalidate the evaluation basis.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Corrective actions are taken if the extent of cracking and steel degradation is sufficient to invalidate the evaluation basis.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	<p>C An option is to develop a new evaluation basis that accounts for the degraded condition of the wall (i.e., acceptance by further evaluation).</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>7. Corrective Actions:</p>	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
<p>8. Confirmation Process:</p>	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
<p>9. Administrative Controls:</p>	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
<p>10. Operating Experience:</p>	<p>A Since 1980, masonry walls that perform an intended function have been systematically identified through licensee programs in response to NRC IEB 80-11, USI A-46, and</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p>

	10 CFR 50.48. NRC IN 87-67 documented lessons learned from the NRC IEB 80-11 program, and provided recommendations for administrative controls and periodic inspection to ensure that the evaluation basis for each safety-significant masonry wall is maintained. Whether conducted as a stand-alone program or as part of structures monitoring for MR, a masonry wall AMP that incorporates the recommendations delineated in NRC IN 87-67 should ensure that the intended functions of all masonry walls within the scope of license renewal are maintained for the period of extended operation.	Comment:
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EXCEPTIONS

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AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

GALL AMP: XI.S6 Structures Monitoring Program

REVIEWER: _____

DATE: _____

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A Implementation of structures monitoring under 10 CFR 50.65 (the Maintenance Rule) is addressed in Nuclear Regulatory Commission (NRC) Regulatory Guide (RG) 1.160, Rev. 2, and NUMARC 93-01, Rev. 2. These two documents provide guidance for development of licensee-specific programs to monitor the condition of structures and structural components within the scope of the Maintenance Rule, such that there is no loss of structure or structural component intended function. Because structures monitoring programs are licensee-specific, the Evaluation and Technical Basis for this aging management program (AMP) is based on the implementation guidance provided in Regulatory Guide 1.160, Rev. 2, and NUMARC 93-01, Rev. 2. Existing licensee-specific programs developed for the implementation of structures monitoring under 10 CFR 50.65 are acceptable for license renewal provided these programs satisfy the 10 attributes described below.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	B If protective coatings are relied upon to manage the effects of aging for any structures included in the scope of this AMP, the structures monitoring program is to address protective coating monitoring and maintenance.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

1. Scope of Program	A The applicant specifies the structure/aging effect combinations that are managed by its structures monitoring program.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
2. Preventive Actions:	A No preventive actions are specified.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/Inspected:	A For each structure/aging effect combination, the specific parameters monitored or inspected are selected to ensure that aging degradation leading to loss of intended functions will be detected and the extent of degradation can be determined.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Parameters monitored or inspected are to be commensurate with industry codes, standards and guidelines, and are to also consider industry and plant-specific operating experience.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Although not required, ACI 349.3R-96 and ANSI/ASCE 11-90 provide an acceptable basis for selection of parameters to be monitored or inspected for concrete and steel structural elements and for steel liners, joints, coatings, and waterproofing membranes (if applicable).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	D If necessary for managing settlement and erosion of porous concrete subfoundations, the continued functionality of a site de-watering system is to be monitored.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	E The plant-specific structures monitoring program is to contain sufficient detail on parameters monitored or inspected to conclude that this program attribute is satisfied.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A For each structure/aging effect combination, the inspection methods, inspection schedule, and inspector qualifications are selected to ensure that aging degradation will be detected and quantified before there is loss of intended functions.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Inspection methods, inspection schedule, and inspector qualifications are to be commensurate with industry codes, standards and guidelines, and are to also consider industry and plant-specific operating experience.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C Although not required, ACI 349.3R-96 and ANSI/ASCE 11-90 provide an acceptable basis for addressing detection of aging effects..	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	D The plant-specific structures monitoring program is to contain sufficient detail on detection to conclude that this program attribute is satisfied.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

5. Monitoring and Trending:	A Regulatory Position 1.5, "Monitoring of Structures," in RG 1.160, Rev. 2, provides an acceptable basis for meeting the attribute.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B A structure is monitored in accordance with 10 CFR 50.65 (a)(2) provided there is no significant degradation of the structure.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C A structure is monitored in accordance with 10 CFR 50.65 (a)(1) if the extent of degradation is such that the structure may not meet its design basis or, if allowed to continue uncorrected until the next normally scheduled assessment, may not meet its design basis.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A For each structure/aging effect combination, the acceptance criteria are selected to ensure that the need for corrective actions will be identified before loss of intended functions.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Acceptance criteria are to be commensurate with industry codes, standards and guidelines, and are to also consider industry and plant-specific operating experience.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	<p>C Although not required, ACI 349.3R-96 provides an acceptable basis for developing acceptance criteria for concrete structural elements, steel liners, joints, coatings, and waterproofing membranes.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>D The plant-specific structures monitoring program is to contain sufficient detail on acceptance criteria to conclude that this program attribute is satisfied.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
<p>7. Corrective Actions:</p>	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
<p>8. Confirmation Process:</p>	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>

9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A Although in many plants structures monitoring programs have only recently been implemented, plant maintenance has been ongoing since initial plant operation. A plant-specific program that includes the attributes described above will be an effective AMP for license renewal.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

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AUDIT WORKSHEET GALL REPORT AMP

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LRA AMP: _____

REVIEWER: _____

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GALL AMP: XI.S7 RG 1.127, Inspection of Water-Control Structures Associated With Nuclear Power Plants

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A Nuclear Regulatory Commission (NRC) Regulatory Guide (RG) 1.127, Revision 1, "Inspection of Water-Control Structures Associated with Nuclear Power Plants," describes an acceptable basis for developing an inservice inspection and surveillance program for dams, slopes, canals, and other water-control structures associated with emergency cooling water systems or flood protection of nuclear power plants.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	B Water-control structures covered by the RG 1.127 program include concrete structures; embankment structures; spillway structures and outlet works; reservoirs; cooling water channels and canals, and intake and discharge structures; and safety and performance instrumentation.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	C For plants not committed to RG 1.127, Revision 1, aging management of water-control structures may be included in the Structures Monitoring Program (XI.S6). Even if plant is committed to RG 1.127, Revision 1, aging management of certain structures and components may be included in the Structures Monitoring Program (XI.S6). However, details pertaining to water-control structures are to incorporate the attributes described herein.	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

1. Scope of Program	A RG 1.127 applies to water-control structures associated with emergency cooling water systems or flood protection of nuclear power plants.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B The water-control structures included in the RG 1.127 program are concrete structures; embankment structures; spillway structures and outlet works; reservoirs; cooling water channels and canals, and intake and discharge structures; and safety and performance instrumentation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
2. Preventive Actions:	A No preventive actions are specified; RG 1.127 is a monitoring program.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/Inspected:	A RG 1.127 identifies the parameters to be monitored and inspected for water-control structures. The parameters vary depending on the particular structure. Parameters to be monitored and inspected for concrete structures include cracking., movements (e.g., settlement, heaving, deflection), conditions at junctions with abutments and embankments, erosion, cavitation, seepage, and leakage.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Parameters to be monitored and inspected for earthen embankment structures include settlement, depressions, sink holes, slope stability (e.g., irregularities in alignment and variances from originally constructed slopes), seepage, proper functioning of drainage systems, and degradation of slope protection features.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	C Further details of parameters to be monitored and inspected for these and other water-control structures are specified in Section C.2 of RG 1.127..	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A Visual inspections are primarily used to detect degradation of water-control structures.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B RG 1.127 indicates that the available records and readings of installed instruments are to be reviewed to detect any unusual performance or distress that may be indicative of degradation.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C RG 1.127 describes periodic inspections, to be performed at least once every five years.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	D RG 1.127 also describes special inspections immediately following the occurrence of significant natural phenomena, such as large floods, earthquakes, hurricanes, tornadoes, and intense local rainfalls.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

5. Monitoring and Trending:	A Water-control structures are monitored by periodic inspection as described in RG 1.127.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B In addition to monitoring the aging effects identified in Attribute (3) above, inspections also monitor the adequacy and quality of maintenance and operating procedures. RG 1.127 does not discuss trending.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
6. Acceptance Criteria:	A Although not required, plant-specific acceptance criteria based on Chapter 5 of ACI 349.3R-96 are acceptable.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B Acceptance criteria for earthen structures such as dams, canals, and embankments are to be consistent with programs falling within the regulatory jurisdiction of the Federal Energy Regulatory Commission (FERC) or the U.S. Army Corps of Engineers.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions:	A RG 1.127 recommends that the licensee's inservice inspection and surveillance program include periodic inspections of water-control structures to identify deviations in structural conditions due to age-related deterioration and degradation from the original design basis. When findings indicate that significant changes have occurred, the conditions are to be evaluated. This includes a technical assessment of the causes of distress or abnormal conditions, an evaluation of the behavior or movement of the structure, and recommendations for remedial or mitigating measures.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
10. Operating Experience:	<p>A Degradation of water-control structures has been detected, through RG 1.127 programs, at a number of nuclear power plants, and in some cases, it has required remedial action.</p> <p>NOTE: For dam inspection and maintenance, programs under the regulatory jurisdiction of FERC or the U.S. Army Corps of Engineers, continued through the period of extended operation, will be adequate for the purpose of aging management. For programs not falling under the regulatory jurisdiction of FERC or the U.S. Army Corps of Engineers, the staff will evaluate the effectiveness of the aging management program based on compatibility to the common practices of the FERC and Corps programs.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

EXCEPTIONS

Item Number	Program Elements	LRA Exception Description	Basis for Accepting Exception	Documents Reviewed (Identifier, Para.# and/or Page #)
1.				
2.				
...				

ENHANCEMENTS

Item Number	Program Elements	LRA Enhancement Description	Basis for Accepting Enhancement	Documents Reviewed (Identifier, Para.# and/or Page #)
1.				
2.				
...				

Document Reviewed During Audit:

DOCUMENT NUMBER	IDENTIFIER (NUMBER)	TITLE	REVISION AND/OR DATE
1.			
2.			
3.			
4.			
....			

AUDIT WORKSHEET GALL REPORT AMP

PLANT: _____

LRA AMP: _____

REVIEWER: _____

DATE: _____

GALL AMP: XI.S8 Protective Coating Monitoring And Maintenance Program

PROGRAM ELEMENT	AUDITABLE GALL CRITERIA	DOCUMENTATION OF AUDIT FINDING
<u>Program Description</u>	A Regulatory Position C4 in RG 1.54, Rev. 1, describes an acceptable technical basis for a Service Level I coatings monitoring and maintenance program that can be credited for managing the effects of corrosion for carbon steel elements inside containment.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B A comparable program for monitoring and maintaining protective coatings inside containment, developed in accordance with RG 1.54, Rev. 0 or the American National Standards Institute (ANSI) standards (since withdrawn) referenced in RG 1.54, Rev. 0, and coatings maintenance programs described in licensee responses to GL 98-04, is also acceptable as an aging management program (AMP) for license renewal	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
1. Scope of Program	A The minimum scope of the program is Service Level I coatings, defined in RG 1.54, Rev 1, as follows: "Service Level I coatings are used in areas inside the reactor containment where the coating failure could adversely affect the operation of post-accident fluid systems and thereby impair safe shutdown."	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

2. Preventive Actions:	A With respect to loss of material due to corrosion of carbon steel elements, this program is a preventive action.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/Inspected:	A Regulatory Position C4 in RG 1.54, Rev 1, states that "ASTM D 5163-96 provides guidelines that are acceptable to the NRC staff for establishing an in-service coatings monitoring program for Service Level I coating systems in operating nuclear power plants..." ASTM D 5163-05a, subparagraph 9.2, identifies the parameters monitored or inspected to be "any visible defects, such as blistering , cracking, flaking, peeling, rusting, and physical damage."	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects:	A ASTM D 5163-05a, paragraph 6, defines the inspection frequency to be each refueling outage or during other major maintenance outages as needed.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	B ASTM D 5163-05a, paragraph 9, discusses the qualifications for inspection personnel, the inspection coordinator and the inspection results evaluator.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
“	C ASTM D 5163-05a, subparagraph 10.1, discusses development of the inspection plan and the inspection methods to be used.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:

“	<p>D After a walk-through, or during the general visual inspection, thorough visual inspections shall be carried out on previously designated areas and on areas noted as deficient during the walk-through.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>E A thorough visual inspection shall also be carried out on all coatings near sumps or screens associated with the Emergency Core Cooling System (ECCS)." This subparagraph also addresses field documentation of inspection results. ASTM D 5163-05a subparagraph 9.5, identifies instruments and equipment needed for inspection.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
5. Monitoring and Trending:	<p>A ASTM D 5163-05a identifies monitoring and trending activities in subparagraph 6.2, which specifies a pre-inspection review of the previous two monitoring reports, and in subparagraph 10.1.2, which specifies that the inspection report should prioritize repair areas as either needing repair during the same outage or postponed to future outages, but under surveillance the interim period.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
6. Acceptance Criteria:	<p>A ASTM D 5163-05a, subparagraphs 10.2.1 through 10.2.6, 10.3 and 10.4, contain one acceptable method for characterization, documentation, and testing of defective or deficient coating surfaces.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B ASTM D 5163-05a, paragraph 11, addresses evaluation. It specifies that the inspection report is to be evaluated by the responsible evaluation personnel, who prepare a summary of findings and recommendations for future surveillance or repair, including an analysis of reasons or suspected reasons for failure.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:</p> <p>Comment:</p>

7. Corrective Actions:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
8. Confirmation Process:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>
9. Administrative Controls:	<p>The consistency of LRA Section B.0.3, Quality Assurance Program and Administrative Controls, with GALL and/or the SRP-LR is reviewed by DIPM.</p> <p>The specific AMP discussion for this program element is reviewed as part of this AMP. The review is based on any technical discussions included in the LRA and on the basis documents. If specific correction actions are described, these corrective actions are reviewed for adequacy, timeless, root cause determination, and prevention of recurrence.</p>	<p>Consistent with LRA Section B.0.3: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Comment:</p>

10. Operating Experience:	A NRC Generic Letter 98-04 describes industry experience pertaining to coatings degradation inside containment and the consequential clogging of sump strainers. RG 1.54, Rev. 1, was issued in July 2000. Monitoring and maintenance of Service Level I coatings conducted in accordance with Regulatory Position C4 is expected to be an effective program for managing degradation of Service Level I coatings, and consequently an effective means to manage loss of material due to corrosion of carbon steel structural elements inside containment.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria: Comment:
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EXCEPTIONS

Item Number	Program Elements	LRA Exception Description	Basis for Accepting Exception	Documents Reviewed (Identifier, Para.# and/or Page #)
1.				
2.				
...				

ENHANCEMENTS

Item Number	Program Elements	LRA Enhancement Description	Basis for Accepting Enhancement	Documents Reviewed (Identifier, Para.# and/or Page #)
1.				
2.				
...				

Document Reviewed During Audit:

DOCUMENT NUMBER	IDENTIFIER (NUMBER)	TITLE	REVISION AND/OR DATE
1.			
2.			
3.			
4.			
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Appendix F

Plant-Specific AMP Audit/Review Worksheet

None

Appendix G

AMR Comparison Worksheets

Appendix G

AMR Comparison Worksheets

The project team reviewer should document its AMR reviews determination in spreadsheets of the Table 1 and Table 2 AMR line-items. The documentation should contain the same information as would have been captured in the Table provided in this appendix.

The project team reviewer should use the tables provided in this appendix if the electronic spreadsheet format is not used.

OCGS AMR Component (Table 1) Worksheet		Audit Date:
Unit:	Table No.:	Chapter:
Auditor Name(s) :		

The audit team verified that items in Table 3.x.1 (Table 1) correspond to items in the GALL Volume 1, Table X. All items applicable to PWRs in Table 1 were reviewed and are addressed in the following table.

Item No.	Further Evaluation Recommended	Discussion

Audit Remarks (Document all questions for the applicant here):

No.	Question for applicant (draft per RAI guidance)	Response (with date)

References/Documents Used:

- 1.
- 2.
- 3.
- 4.

OCGS AMR MEAP Comparison (Table 2) Worksheet			Audit Date:
Unit:	Table No.:	Chapter:	
Auditor Name(s) :			

Line items to which Notes A, B, C, D, and E are applied (except for those assigned to DE) were reviewed for: 1) consistency with NUREG-1801, Volume 2 tables, and 2) adequacy of the aging managing programs. All items in the Table 2 of the system named above are acceptable with the exception of items in **boldface** type. (Reviewers need not duplicate information in the 2nd-5th columns that are reflected in the discussion/draft audit report.)

LRA Page No.	Component Type	Material	Environment	Aging Effect	Note	Discussion (draft as Audit Report input)

Audit Remarks (Document all questions for the applicant here):

No.	Question for applicant (draft per RAI guidance)	Response (with date)

References/Documents Used:

- 5.
- 6.
- 7.

Appendix H

Acronyms and Abbreviations

Appendix H

Abbreviations and Acronyms

ADAMS	Agency-wide Documents Access and Management System
AmerGen	AmerGen Energy Company, LLC
AMP	aging management program
AMR	aging management review
ASME	American Society of Mechanical Engineers
BNL	Brookhaven National Laboratory
BTP	branch technical position
CLB	current licensing basis
DE	Division of Engineering
DIPM	Division of Inspection Program Management
EPRI	Electric Power Research Institute
FSAR	final safety analysis report
GALL	Generic Aging Lessons Learned
ISG	interim staff guidance
LRA	license renewal application
MEAP	material, environment, aging effect, program
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OCGS	Oyster Creek Generating Station
RAI	request for additional information
RLEP-B	License Renewal and Environmental Impacts Program, Section B
RLSB	License Renewal and Standardization Branch
SC	structures and components
SER	safety evaluation report
SRP-LR	Standard Review Plan-License Renewal
SSC	structure, system, and component
UFSAR	updated final safety analysis report