NRC000123
Submitted: March 31, 2012

Audit and Review Plan for Plant Aging Management Reviews and Programs

Indian Point Nuclear Generating Unit Nos. 2 and 3

Docket No.: 50-247
50-286

TABLE OF CONTENTS

TABLES

FIGURES

Audit and Review Plan for Plant Aging Management Reviews and Programs

1. INTRODUCTION

By letter dated April 23, 2007, Entergy Nuclear Operations Inc. submitted to the U.S. Nuclear Regulatory Commission (NRC) its application for renewal of Operating License Nos. DPR-26 and DPR-64 respectively for the Indian Point Nuclear Generating Unit Nos. 2 and 3 (IP2) and (IP3). The applicant requested renewal of the operating licenses 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 IP2 and IP3, the Division of License Renewal (DLR), Branch C (RLRC), will lead a project team that will audit and review selected aging management reviews (AMRs) and associated aging management programs (AMPs), and time-limited aging analyses (TLAAs) developed by the applicant to support its LRA for IP2 and IP3. The project team will include NRC staff and engineers provided by BNL, RLRC's technical assistance contractor. Appendix A, "Project Team Membership," lists the project team members. This document is the RLRC plan for auditing and reviewing plant aging management reviews and aging management programs for IP2 and IP3.

The project team will audit and review its assigned AMPs, AMRs, and TLAAs 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, Revision 1, "Standard Review Plan for Review of License Renewal Application for Nuclear Power Plants" (SRP-LR), dated September 2005; the guidance provided in NUREG-1801, Revision 1, "Generic Aging Lessons Learned (GALL) Report," dated September 2005; and this plan. For the scope of work defined in this audit 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 IP2 and IP3 current licensing basis (CLB) for the period of extended operation.

The project team will perform its work at NRC Headquarters, Rockville, Maryland; at BNL's offices in Upton, NY; and at the IP2 and IP3 site in Buchanan, NY. The project team will perform its work in accordance with the schedule shown in Appendix B, "Schedule."
This plan includes the following information:

- **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.

- **Objectives**. The objectives of the audits and reviews addressed by this plan.

- **Summary of Information Provided in License Renewal Application**. Description of the information contained in the license renewal application for IP2 and IP3 that is applicable to this plan.

- **Overview of the Audit, Review, and Documentation Procedure**. Summary of the process the project team will follow to audit and review the LRA information that is within its scope of review.

- **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 LRA information that is within its scope of review, and to document the results of its work.

- **Appendices**. Supporting information. The project team membership is shown in Appendix A and the schedule is shown in Appendix B. The team's work assignments are shown in Appendix C, "Aging Management Program Assignments," Appendix D, "Aging Management Review Assignments," Appendix E “Time-Limited Aging Analysis Review Assignments.” Appendices F, G, and H are the worksheets that the individual team members use to informally document the results of their review and audit work. The application of these worksheets is discussed in Section 6 of this plan. Appendix I is a list of the acronyms, abbreviations, and initialisms used in this 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(s) 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 & environments, (5) the AMPs that are credited to manage the aging effects, and (6) recommendations for further applicant evaluations of aging effects and their 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 AMP, it is incumbent on the applicant to ensure that the plant AMP contains all the program elements of the referenced GALL AMP. In addition, the conditions at the plant must be bounded by the conditions for which the GALL AMP was evaluated. The applicant must certify in its LRA that it completed the verifications and that they are documented onsite in an auditable form.

The SRP-LR also provides staff guidance for reviewing TLAAs. Pursuant to 10 CFR 54.21(c)(1), a license renewal application is required to provide a list of TLAAs, as defined in 10 CFR 54.3. In addition, the applicant must provide a list of plant-specific exemptions granted under 10 CFR 50.12 that are based on TLAAs. The number and type of TLAAs vary depending on the plant-specific CLB.

All six criteria set forth in 10 CFR 54.3 must be satisfied to conclude that a calculation or analysis is a TLAA. Pursuant to 10 CFR 54.3, TLAAs are those licensee calculations and analyses that:

1. Involve systems, structures, and components within the scope of license renewal, as delineated in 10 CFR 54.4(a).

2. Consider the effects of aging.

3. Involve time-limited assumptions defined by the current operating term, for example, 40 years.

4. Were determined to be relevant by the licenses in making a safety determination.

5. Involve conclusions or provide the basis for conclusions related to the capability of the system, structure, or component to perform its intended function(s), as delineated in 10 CFR 54.4(b).

6. Are contained or incorporated by reference in the CLB.

Finally, the applicant must demonstrate that the TLAAs remain valid for the period of extended operation; the TLAAs have been projected to the end of the period of extended operation; or the effects of aging on the intended function(s) will be adequately managed for the period of extended operation. The staff performs a technical review as well as reviews the area relating to the identification of TLAAs. The staff also confirms that the applicant did not omit any TLAAs, as defined in 10 CFR 54.3.

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 IP2 and IP3 is described in Sections 5 and 6 of this plan. It is intended to accomplish the following objectives:

- For IP2 and IP3 AMPs that the applicant claims are consistent with GALL AMPs, verify that the plant AMPs contain the program elements of the referenced GALL AMP and that the conditions at the plant are bounded by the conditions for which the GALL AMPs were evaluated.

- For IP2 and IP3 AMPs that the applicant claims are consistent with GALL AMPs with exceptions, verify that the plant AMPs contain the program elements of the referenced GALL AMPs and that the conditions at the plant are bounded by the conditions for which the GALL AMPs were evaluated. In addition, verify that the applicant has documented an acceptable technical basis for each exception.

- For IP2 and IP3 AMPs that the applicant claims will be consistent with GALL AMPs after specified enhancements are implemented, verify that the plant AMPs, with the enhancements, will be consistent with the referenced GALL 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.

- For plant-specific IP2 and IP3 AMPs, verify the AMPs are acceptable on the basis of a technical review. Use the worksheet provided in Appendix G ro assess the

adequacy of the AMPs against 10 program elements described in Branch Technical Position RLSB-1 “Aging Management Review - Generic,” in Appendix A to the SRP-LR.

- For AMR line items that the applicant claims are consistent with the GALL Report, determine that these AMR line items are consistent with the recommendation of the GALL Report.

- For AMR line items (Table 1s) that the applicant claims are not applicable with the GALL Report, determine that these AMR line items are acceptable on the basis of a technical review.

- For AMR line items that the applicant claims consistent with AMR line items that the staff has previously approved for another plant, determine that these AMR line items are acceptable on the basis of a technical review.

- For AMR line items for which the GALL Report recommends further evaluation, determine that the applicant has addressed the further evaluation, and evaluating the AMRs in accordance with the SRP-LR.

- For TLAAs, determine that the applicant has properly identified the TLAAs. TLAAs are certain plant-specific safety analyses that are based on explicitly assumed 40-year plant life (for example, aspects of the reactor vessel design). Pursuant to 10 CFR 54.21(c)(1), a license renewal applicant is required to provide a list of TLAAs, as defined in 10 CFR 54.3. The area relating to the identification of TLAAs is reviewed. TLAAs may have developed since issuance of a plant’s operating license. As indicated in 10 CFR 54.30, the adequacy of the plant’s CLB, which includes TLAAs, is not an area within the scope of the license renewal review. Any question regarding the inadequacy of the CLB must be addressed under the backfit rule (10 CFR 50.109) and is separate from the license renewal process.

- Determine that the applicant has demonstrated that (1) the TLAAs remain valid for the period of extended operation; (2) the TLAAs have been projected to the end of the period of extended operation; or (3) the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

4. SUMMARY OF INFORMATION PROVIDED IN THE LICENSE RENEWAL APPLICATION

4.1 Aging Management Review Results

The IP2 and IP3 LRA closely follows the standard LRA format presented in NEI 95-10, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54 – The License Renewal Rule," Revision 6, June 2005. Section 3 of the LRA provides the results of the aging management review for structures and components that the applicant identified as being subject to aging management review.

LRA Table 3.0-1, Table 3.0-2, and Table 3.0-3 provide descriptions of the mechanical, structural, and electrical and instrument and controls service environments, respectively, 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 the reactor coolant system subsection of the LRA Section 3, this is Table 3.1.1, and in the engineered safety features subsection of LRA Section 3, this is Table 3.2.1. For ease of discussion, these table types will hereafter be referred to as "Table 1." These tables are derived from the corresponding tables in NUREG-1801, Volume 1, and present summary information from the AMRs.

Definition	
1	Reactor Vessel, Internals, and Reactor Coolant System
2	Engineered Safety Features Systems
3	Auxiliary Systems
4	Steam and Power Conversion Systems
5	Containments, Structures, and Component Supports
6	Electrical and Instrumentation and Controls

The second table type is a series of tables labeled Table 3.X.2-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 coolant system subsection, the AMR results for the reactor vessel and internals are presented in Table 3.1.2-1, and the results for the steam generators are in Table 3.1.2-3. In the engineered safety features subsection, the nuclear sampling system results are presented in Table 3.2.2-1, and the containment spray system is in Table 3.2.2-2. For ease of discussion, these table types will hereafter be referred to as "Table 2." These tables present the results of the AMRs.

4.1.1 IP2 and IP3 AMR Comparison with the GALL Report

The applicant compared the IP2 and IP3 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.

To take full advantage of the GALL Report, IP2 and IP3 AMR results have been compared w/ information set forth in the tables of NUREG-1801. Results of that comparison are provided in the following two table types, Table 1 and Table 2.

4.1.1.1 Purpose of Table 1

The purpose of Table 1 is to provide a summary comparison of how the IP2 and IP3 AMR results align with the corresponding table of NUREG-1801, Volume 1. These tables are essentially the same as Tables 1 through 6 provided in NUREG-1801, Volume 1, with the following exceptions:

- The “ID” column is labeled "Item Number" and the spacing has been expanded to include the table number.
- The "Type" column has been deleted. Items applicable to BWRs only are noted as such.
- The "Related Generic Item" and “Unique Item” columns have been replaced by a "Discussion" column.

The "Item Number" column provides a means to cross-reference to Table 1 from the Table 2s.

Further information is provided in the "Discussion" column. The following are examples of information that might be contained within this column:

- Any "Further Evaluation Recommended" information or reference to the location of that information.
- The name of a plant-specific program being used.
- Exceptions to the NUREG-1801 assumptions.
- A discussion of how the line item is consistent with the corresponding line item in NUREG-1801, Volume 1, when it may not be intuitively obvious.
- A discussion of how the line item is different than the corresponding line item in NUREG-1801, Volume 1, when it may appear to be consistent.

4.1.1.2 Purpose of Table 2

Table 2 provides results of the aging management reviews for those structures and components identified in Section 2 as being subject to aging management review. There is a Table 2 for each aging management review within a NUREG-1801 system group. For example, the engineered safety features system group contains tables specific to nuclear sampling, containment spray, containment integrated leak rate test, decontamination, liquid radwaste, reactor makeup water, containment purge HVAC, breathing air, hydrogen control, high pressure coolant injection, and residual heat removal.

Table 2 consists of the following nine columns:

Component Type

Column 1 identifies the component types from Section 2 of this application that are subject to aging management review. Similar to Section 2, component types are listed in alphabetical order. In the Class 1 tables in Section 3.1 and the structural tables in Section 3.5, component types are alphabetical by sub-groups.

The term "piping" in component lists may include pipe, pipe fittings (such as elbows & reducers), flow elements, orifices, and thermowells. If such components have unique tag numbers or the specific component has a function other than pressure boundary, then flow elements, orifices and thermowells are identified as a separate component type.

The term "heat exchanger (shell)" may include the bonnet/channel head and tubesheet. In cases where the bonnet/channel head and tubesheet provide a unique material and environment combination, they will be uniquely identified as a separate component type.

The general component type of "tank" includes components identified as tanks or accumulators on LRA drawings.

Intended Function

Column 2 identifies the license renewal intended functions (using abbreviations where necessary) for the listed component types. Definitions and abbreviations of intended functions are listed in Table 2.0-1 in Section 2.

Material

Column 3 lists the specific materials of construction for the component type being evaluated.

Environment

Column 4 lists the environment to which the component types are exposed. Internal/external service environments are indicated. A description of these environments is provided in Tables 3.0-1, 3.0-2, and 3.0-3 for mechanical, structural, and electrical and instrument and controls components, respectively.

Aging Effect Requiring Management

Column 5 lists the aging effects requiring management for material and environment combinations for each component type.

Aging Management Programs (AMP)

Column 6 lists the programs used to manage the aging effects requiring management.

NUREG-1801, Vol. 2, Item

Column 7 documents identified consistencies by noting the appropriate NUREG-1801, Volume 2, item number. If there is no corresponding item number in NUREG-1801, Volume 2, for a particular combination of factors, column 7 indicates “None” for this item.

Each combination of the following factors listed in Table 2 is compared to NUREG-1801, Volume 2, to identify consistencies:

- Component type.
- Material.
- Environment.
- Aging effect requiring management.
- Aging management program.

Table 1 Item

Column 8 lists the corresponding line item from Table 1. If there is no corresponding item in NUREG-1801, Volume 1, column 8 is left blank.

Each combination of the following that has an identified NUREG-1801, Volume 2 item number also has a Table 1 line item reference number:

- Component type.
- Material.
- Environment.
- Aging effect requiring management.
- Aging management program.

Notes

Column 9 contains notes that are used to describe the degree of consistency with the line items in NUREG-1801, Volume 2. Notes that use letter designations are standard notes 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 with the NEI standardized format for license renewal applications by letter dated April 7, 2003, from P. T. Kuo, NRC, to A. Nelson, NEI (ML030990052). Notes that use numeric designators are specific to IP2 and IP3.

IP2 and IP3 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 IP2 and IP3 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 “None” is indicated in column 7, 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.

4.1.2 Plant-Specific Programs

Many of the GALL Report evaluations refer to plant-specific programs. In these cases, the applicant considers the IP2 and IP3 evaluation to be consistent with the GALL Report if the other elements are consistent. Note E is used to indicate that the AMR line-item is consistent with the GALL Report for material, environment, and aging effect, but a different AMP is credited. The project team will evaluate these line-items to determine that the AMP credited by the applicant is applicable.

4.2 Time-Limited Aging Analyses

The IP2 and IP3 LRA closely follows the standard LRA format presented in Revision 6 of NEI 95-10, “Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule.” Section 4 of the IP2 and IP3 LRA addresses TLAAs. In Section 4.1.1, the IP2 and IP3 LRA states that the calculations and evaluations that could potentially meet the six criteria of 10 CFR 54.3 were identified by searching CLB documents including the following:

A. The Updated Safety Analysis Report (USAR)
B. Technical Specifications
C. The NRC Safety Evaluation Report (SER) for the original operating license
D. All subsequent NRC Safety Evaluations (SEs)
E. IP2 and IP3 and NRC docketed licensing correspondence.

Also, in Section 4.1.1, the IP2 and IP3 LRA states that as required by 10 CFR 54.21(c)(1), an evaluation of IP2 and IP3-specific TLAAs must be performed to demonstrate that:

(i) The analyses remain valid for the period of extended operation;

(ii) The analyses have been projected to the end of the period of extended operation; or

(iii) The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

In the IP2 and IP3 LRA, the applicant summarized the results of the above evaluations in Table 4.1-1. These evaluations are discussed in subsequent sections of IP2 and IP3 LRA Section 4.

Section 10 CFR 54.21(c) also requires that the application for a renewed license includes a list of plant-specific exemptions granted pursuant to 10 CFR 50.12 and in effect that are based on TLAAs as defined in 10 CFR 54.3. The IP2 and IP3 performed this by reviewing IP2 and IP3 docketed correspondence which identified IP2 and IP3 exemptions. Section 4.1.2 of the IP2 and IP3 LRA states that there are no IP2 and IP3 exemptions that depend on TLAAs.

The IP2 and IP3 LRA next includes a separate section for each of the identified TLAAs within the outline of the corresponding NUREG-1800 TLAA category. The TLAA categories are outlined in the next table.

TLAA Description	Resolution Option	Section
Reactor Vessel Neutron Embrittlement Analyses		4.2
Charpy upper-shelf energy	Analyses projected 10 CFR 54.21(c)(1)(ii)	4.2.2
Pressure/temperature limits	P-T limit curves managed 10 CFR 54.21(c)(1)(iii)	4.2.3
Low temperature overpressure protection (LTOP)	LTOP limits managed 10CFR54.21(c)(1)(iii)	4.2.4
Pressurized Thermal Shock	IP2: Analysis projected 10 CFR 54.21(c)(1)(ii) IP3: Aging effects managed 10 CFR 54.21(c)(1)(iii)	4.2.5
Metal Fatigue Analyses		4.3
Reactor vessel	Analyses remain valid 10 CFR 54.21(c)(1)(i)	4.3.1.1
Reactor vessel internals	Analyses remain valid 10 CFR 54.21(c)(1)(i)	4.3.1.2
Pressurizer	Analyses remain valid 10 CFR 54.21(c)(1)(i)	4.3.1.3
Pressurizer insurge/outsurge transients	Analyses remain valid 10 CFR 54.21(c)(1)(i)	4.3.1.3
Steam generator	Analyses remain valid 10 CFR 54.21(c)(1)(i)	4.3.1.4
Reactor coolant pump	Analyses remain valid 10 CFR 54.21(c)(1)(i)	4.3.1.5

TLAA Description	Resolution Option	Section
Control rod drive mechanisms	Analyses remain valid 10 CFR 54.21(c)(1)(i)	4.3.1.6
Regenerative letdown heat exchanger	Analyses remain valid 10 CFR 54.21(c)(1)(i)	4.3.1.7
Class 1 piping and in-line components - ANSI B31.1 piping	Analyses remain valid 10 CFR 54.21(c)(1)(i)	4.3.1.8
Class 1 piping and in-line components - pressurizer surge line	Analyses remain valid 10 CFR 54.21(c)(1)(i)	4.3.1.8
Class 1 piping and in-line components - thermowells	Analyses remain valid 10 CFR 54.21(c)(1)(i)	4.3.1.8
Class 1 piping and in-line components - charging system	Analysis will be updated as part of environmental fatigue evaluation. See Section 4.3.3.	4.3.1.8
Class 1 piping and in-line components - loop 3 accumulator nozzle (IP2 only)	Analyses remain valid 10 CFR 54.21(c)(1)(i)	4.3.1.8
Non-Class 1 piping and in-line components	Analyses remain valid 10 CFR 54.21(c)(1)(i)	4.3.2
Non-Class 1, non-piping components - residual heat removal heat exchanger	Analyses remain valid 10 CFR 54.21(c)(1)(i)	4.3.2
Effects of reactor water environment on fatigue life	Analyses remain valid 10 CFR 54.21(c)(1)(i) OR Aging effect managed 10 CFR 54.21(c)(1)(iii)	4.3.3
Environmental Qualification of Electrical Components	Aging effect managed 10 CFR 54.21(c)(1)(iii)	4.4
Concrete Containment Tendon Prestress	N/A	4.5

TLAA Description	Resolution Option	Section
Containment Liner Plate and Penetrations Fatigue Analyses IP2: Liner Plate at Containment Penetration (feedwater line #22) IP3: None	 IP2: Analyses remain valid 10 CFR 54.21(c)(1)(i) for liner plate; no TLAA for penetration IP3: No TLAA	4.6
Plant-Specific Time-Limited Aging Analyses		4.7
Reactor Coolant Pump Flywheel Analysis	N/A	4.7.1
Leak Before Break (LBB)	Analysis remains valid 10 CFR 54.21(c)(1)(i)	4.7.2
Steam Generator Flow Induced Vibration and Tube Wear	IP2: Analysis remains valid 10 CFR 54.21(c)(1)(i) IP3: Analyses projected 10 CFR 54.21(c)(1)(ii)	4.7.3

5. OVERVIEW OF AUDIT, REVIEW, AND DOCUMENTATION PROCEDURE

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

5.1 Aging Management Programs

For the IP2 and IP3 AMPs for which the applicant claimed consistency with the AMPs included in the GALL Report, the project team will review the IP2 and IP3 AMP descriptions and compare program elements for the IP2 and IP3 AMPs to the corresponding program elements for the GALL AMPs. The project team will verify that the IP2 and IP3 AMPs contain the program elements of the referenced GALL program and that the conditions at the plant are bounded by the conditions for which the GALL program was evaluated. Table 1 of this audit and review plan summarizes the program elements that comprise an aging management program. The License Renewal Branch C (RLRC) will review and determine the adequacy of the applicant's 10 CFR 50, Appendix B Program. Other aspects of these program elements will be reviewed by the project team.

For IP2 and IP3 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 AMP, as modified by the exception and/or the

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 IP2 and IP3 AMPs credited by the applicant and the GALL Report AMPs. In these cases, the project team will review the difference to determine whether the IP2 and IP3 AMP, as modified by the difference, would adequately manage the aging effects for which it is credited.

For those IP2 and IP3 AMPs that are not included in the GALL Report (i.e., plant- specific AMPs), the project team will review the AMP against the ten program elements defined in Appendix A of the SRP-LR. The RLRC will review and determine the adequacy of the applicant's 10 CFR 50, Appendix B Program. Other aspects of these program elements will be reviewed by the project team. On the basis of its reviews, the project team will determine whether these AMPs will manage the aging effects for which they are credited.

5.2 Aging Management Reviews

The AMRs in the IP2 and IP3 LRA fall into three broad categories: (1) AMR results that are consistent with the GALL Report (i.e., those that the GALL Report concludes are adequate to manage aging of the components referenced in the GALL Report), (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, and (3) AMR results that are not consistent with or not addressed in the GALL Report. For the first category AMR reviews, the project team will determine (1) whether the AMRs reported by the applicant to be consistent with the GALL Report are indeed consistent with the GALL Report, and (2) whether the AMRs reported by the applicant to be managed using plant-specific AMPs are technically acceptable. For the second category AMR review, 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. For the third category AMR review, the project team will review the results of the AMRs for material, environment, AERM, and AMP combinations to determine the technical adequacy.

5.3 Time-Limited Aging Analyses

Generally, the TLAAs in the IP2 and IP3 LRA fall into the broad category of those that are consistent with the NUREG-1800 TLAA categories. However, there are 12 plant-specific exemptions identified in the IP2 and IP3 LRA that depend on TLAAs.

For its TLAA reviews, the project team will determine if the applicant had provided adequate information to meet the requirements of 10 CFR 54.21(c)(1) and 10 CFR 54.21(c)(2).

Further, the project team will conduct both regulatory evaluations and technical evaluations to determine, as defined in 10 CFR 54.3, that each TLAA meets the following six criteria:

1. Involve systems, structures, and components that are within the scope of license renewal, as delineated in 10 CFR 54.4(e).

2. Consider the effects of aging.

3. Involve time-limited assumptions defined by the current operating term (40 years).

4. Determined to be relevant by the applicant in making a safety determination.

5. Involve conclusions, or provide the basis for conclusions, related to the capability of the system, structure, and component to perform its intended functions, as delineated in 10 CFR 54.4(b).

6. Contained or incorporated by reference in the CLB.

In addition, the project team will also review the TLAAs to determine if there are emerging issues that should be further evaluated by technical specialists in the NRC Divisions of Component Integrity (DCI) or the Division of Engineering (DE). This is not expected to be an issue for TLAAs for which the applicant claims consistency with 10 CFR 54.21(c)(I) “the analyses remain valid for the period of extended operation” or 10 CFR 54.21(c)(iii) “the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.”

For TLAAs for which the applicant claims consistency with 10 CFR 54.21(c)(ii) - “the analyses have been projected to the end of the period of extended operation,” the audit team leader will be consulted to determine which TLAAs the audit team will be capable of reviewing. Consideration should be given to project team expertise, past precedent, and complexity of the provided analysis. Candidates for further review by technical specialists could be such as the following:

A. Reactor Vessel Neutron Embrittlement
B. Plant-Specific TLAAs

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.

5.5 Documents Reviewed by the Project Team

In performing its work, the project team will rely heavily on the 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, AMR, and TLAA basis documents (catalogs of the documentation used by the applicant to develop or justify its AMPs, AMRs, and TLAAs), 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 Status Meeting

At the conclusion of its audits and reviews, the project team will debrief the applicant's license renewal staff and management regarding the status of the audits and reviews of the LRA AMPs, AMRs and TLAAs assigned to the project team.

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 summary, and a safety evaluation report (SER) input. The project team will also prepare questions during site visits and will track the applicant's responses to the questions.

5.7.1 Audit and Review Plan

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

5.7.2 Worksheets

Each project team member will informally document the results of his or her work on a variety of worksheets. The worksheets are shown in Appendix F, "Consistent with GALL Report AMP Audit/Review Worksheet"; Appendix G, "Plant-Specific AMP Audit/Review Worksheet"; and Appendix H, "AMR Comparison Worksheets." The use of the worksheets is described in Section 6 of this plan.

5.7.3 Questions

As specified in Section 6 of this plan, the project team members will ask the applicant questions during the on-site audits, as appropriate, to facilitate its audit and review activities. The team will also track the applicant's answers to the questions.

5.7.4 Work Packages

After each site visit, the project team leader, in conjunction with the project manager, will assemble work packages for any work that the team will refer to the Office of Nuclear Reactor Regulation (NRR) Division of Engineering (DE) or the Division of Component Integrity (DCI) 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 Requests for Additional Information

The review process described in this plan is structured to resolve as many questions as possible during the site visits. As examples, the site visits are used to obtain clarifications about the LRA and explanations as to where certain information may be found in the LRA or its associated documents. Nevertheless, there may be occasions where an RAI is appropriate to obtain information to support a SER finding. The need for RAIs will be determined by the project team

leader during the in-office project staff review or during site visits 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 NRC receives a response to an RAI from the applicant, the team leader will provide the response to the team member who prepared the RAI. The team member will review the response and determine if it resolves the issue that was the reason for the RAI. The team member will document the disposition of the RAI in the SER input.

5.7.6 Audit and Review Summary

At the conclusion of the audits and reviews, the project team will prepare a summary of the audits and reviews highlighting the status of its review and any potential RAIs.

5.7.7 Safety Evaluation Report Input

The project team will prepare SER input, based on its audit and review, as described in Section 6.5.2 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, perform, and document its 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 decision. Key milestones and activities include, as a minimum:

- Receiving the LRA from the applicant.
- Receiving work split tables from the project manager.
- Making individual work assignments.
- Training project team members.
- Holding the project team kickoff meeting.
- Preparing the audit and review plan.
- Scheduling site visits.
- Scheduling in-office review periods.
- Preparing questions.
- Preparing RAIs.
- Issuing audit and review summary report.
- Issuing SER input.

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

The contractor will develop assignment tables that show which project team member will review each AMP and AMR. Appendix A of this plan shows the project team membership. Appendix C shows the team member assignments for the AMPs. Appendix D of this plan shows the team member assignments for the AMRs. Appendix E shows the project team member assignments for TLAAs.

6.1.3 Training and Preparation

The training and preparation 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 for License Renewal (ISG-LR)
4. LRA AMPs
5. LRA AMRs
6. LRA TLAAs
7. Basis documents (catalogues of information assembled by the applicant to demonstrate the bases for its programs and activities)
8. Implementing procedures
9. Operating experience reports
10. RAIs, audit reports, and SERs for similar plants
11. 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, RAIs, the audit and review summary report, and SER input.

F. Process for interfacing with NRC technical reviewers.

6.2 Aging Management Program (AMP) 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 plan.

6.2.2 Scope of AMP Elements to be Audited and Reviewed

Table 1 of this plan shows the 10 program elements that are used to evaluate the adequacy of each aging management program. These program elements are 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. The RLRC will review and determine the adequacy of the applicant's 10 CFR 50, Appendix B Program. Other aspects of these program elements will be reviewed 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 review and audit each plant AMP that the applicant claims is consistent with the GALL Report.

Preparation

A. For the plant AMP being reviewed, identify the corresponding GALL AMP.

B. Review the associated GALL AMP and identify those elements that will be audited.

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 and SERs for similar plants
5. LRA
6. Basis documents
7. Implementation procedures
8. Operating experience reports (plant-specific and industry)

9. UFSAR

Audit/Review

A. Confirm that IP2 and IP3 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. Did the applicant identity any enhancements to the GALL Report AMP?
3. Are the elements consistent with the GALL Report AMP?

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

C. If an acceptable basis exists for an exception/enhancement or difference, document the basis in the worksheet and later 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 (from NEI 95-10, Revision 6) is as follows:

1. Plant-Specific Operating Experience with Aging Effects Requiring Management. A plant-specific operating experience review should assess the operating and maintenance history. A review of the prior 5 to 10 years of operating and maintenance history should be sufficient. The results of the review should confirm consistency with documented industry operating experience. Differences with previously documented industry experience such as new aging effects or lack of aging effects allow consideration of plant-specific aging management requirements.

2. Plant-Specific Operating Experience with existing Aging Management Programs. The operating experience of AMPs, 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 issue. Operating experience after the issue date of NUREG-1801 should be evaluated and documented as part of the aging management review. In particular, generic communications such as a bulletin, a generic letter, 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 a program element, or an exception or a difference to the GALL Report AMP, 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 (docketed letter submitted under oath and affirmation) to the 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 F, "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.

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. ISG-LR
4. RAIs and SERs for similar plants

5. LRA
6. Basis documents
7. Implementation procedures
8. Operating experience reports (plant-specific and industry)
9. UFSAR
10. Lessons Learned Developed by RLRC

Audit/Review

A. Audit/review the IP2 and IP3 AMP program elements and determine that they are in accordance with the acceptance criteria for the corresponding program 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. 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 (from NEI 95-10, Revision 6) 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 5 to 10 years of operating and maintenance history should be sufficient. The results of the review should confirm consistency with documented industry operating experience. Differences with previously documented industry experience such as new aging effects or lack of aging effects allow consideration of plant-specific aging management requirements.

2. Plant-Specific Operating Experience with Aging Management Programs. The operating experience of aging management programs, including past 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 issue. Operating experience after the issue date of NUREG-1801 should be evaluated and documented as part of the aging management review. In particular, generic

communications such as a bulletin, a generic letter, 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.

C. If it is necessary to ask the applicant a question, follow the process shown in Figure 2.

E. If it is necessary for the applicant to submit additional information to resolve a question or an issue or to support the basis or conclusion, the applicant may voluntarily submit the information as a supplement (docketed letter submitted under oath and affirmation) to the 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 G, "Plant-Specific AMP Audit/Review Worksheet."

6.3 Aging Management Review (AMR) Audits and Reviews

There are two types of AMRs: those that the applicant claims are consistent with the GALL Report, and those that are not consistent with or not included in the GALL Report. Audit and review of both types of AMRs are discussed below.

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 IP2 and IP3 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 AMRs and identify those line items that will be audited/reviewed in conjunction with each of the IP2 and IP3 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. ISG-LR
4. RAIs and SERs for similar plants

5. LRA
6. Basis documents
7. Implementation procedures
8. Operating experience reports (plant-specific and industry)
9. UFSAR
10. Lessons Learned Developed by RLRC

Audit/Review

A. Each AMR line item is coded with a letter which represents a standard note designation.[1] The letter notes are described in Table 2 of this plan. Notes that use numeric designators are plant-specific. The note codes A though 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: “For each structure and component ... [within the scope of this part ... and ... subject to an aging management review] (the applicant) demonstrate(s) 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.”

C. Determine 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 AMP[2] 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.

---

[1] 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).

[2] 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.

3. If Note B applies, review the LRA exceptions and document the basis for acceptance in the worksheet, and later in the SER input. 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 SER input. 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.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, document the basis for acceptance and 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, document the basis for acceptance and 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 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.

8. Review LRA Table 3.X.1. for AMR line items (Table 1s) that the applicant claims are not applicable with the GALL Report, determine that the AMR line items are acceptable on the basis of a technical review.

AMR Audit/Review Worksheets

Document the audits/reviews of plant AMRs using the worksheet provided in Appendix H, "AMR Comparison Worksheets," or on spreadsheets containing similar information.

6.3.2 Plant AMRs that Are Not Consistent with the GALL Report

Review LRA Tables 3.X.2.1 - X (Table 2s) for LRA Sections 3.1 thru 3.6, where the applicant indicated, via Notes F through J, that the combination of component type, material, environment, and AERM does not correspond to a line item in the GALL Report. Specifically, Note F indicates that the material for the AMR line item component is not evaluated in the GALL Report. Note G indicates that the environment for the AMR line item component and material is not evaluated in the GALL Report. Note H indicates that the aging effect for the AMR line item component, material, and environment combination is not evaluated in the GALL Report. Note I indicates that the aging effect identified in the GALL Report for the line item component, material, and environment combination is not applicable. Note J indicates that neither the component nor the material and environment combination for the line item is evaluated in the GALL Report. For component groups not evaluated in the GALL Report (notes F-J), the project team reviews the applicant's evaluation in accordance with Branch Technical Position RLSB-1 (Appendix A.1 of the SRP-LR) to determine the technical adequacy. If during the review a difference is identified, prepare a question to the applicant, in order to obtain clarification. Review the applicant's response to the question and confirm that it is acceptance in accordance with Appendix A.1 of the SRP-LR.

The AMR review involves verification that the applicant has satisfied the requirements of 10 CFR 54.21(a)(3) . This requirement states: “For each structure and component ... [within the scope of this part ... and ... subject to an aging management review] (the applicant) demonstrate(s) 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.”

6.4 Time-Limited Aging Analyses (TLAA) Audits and Reviews

Audit and review of TLAAs are discussed below. The project team will also review the TLAAs to determine if there are emerging issues that should be further evaluated by technical specialists in the NRC Divisions of Component Integrity (DCI) or the Division of Engineering (DE). In general, the project team will review TLAAs that are for which the applicant claims consistency with 10 CFR 54.21(c)(i) “the analyses remain valid for the period of extended operation.” or 10 CFR 54.21(c)(iii) “the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.” For TLAAs for which the applicant claims consistency with 10 CFR 54.21(c)(ii) - “the analyses have been projected to the end of the period of extended operation,” the audit team leader will be consulted to determine which TLAAs the audit team will be capable of reviewing. Consideration should be given to team expertise, past precedent, and complexity of the provided analysis.

6.4.1 Identify Generic TLAA Issues

Figure 4, “Evaluation of TLAAs and Exemptions,” taken from NEI 95-10, Revision 6, shows the process of evaluating and reviewing TLAAs and also identifying the exemptions in effect. This process flowchart shows the activities and decisions used to audit/review each TLAA that the applicant identifies.

Pre-Review Preparation

A. For the IP2 and IP3 TLAAs that the applicant has identified as generic TLAA issues, identify the corresponding TLAAs in NUREG-1800, if appropriate.

B. Review the corresponding TLAAs in NUREG-1800 and identify those that will be audited/reviewed in conjunction with each of the IP2 and IP3 TLAAs.

C. Review the list of the IP2 and IP3 plant-specific exemptions granted pursuant to §50.12 and in effect that are based on TLAAs as defined in §54.3. The application shall include an evaluation that justifies the continuation of these exemptions for the period of extended operation.

D. Identify and locate the documents needed to perform the review. These may include, but are not limited to, the following:

1. Excel database on TLAAs summarizing how earlier LRAs and SERs were presented and reviewed
2. TLAAs
3. GALL Report
4. SRP-LR
5. ISG-LR
6. RAIs, audit and review reports, and SERs for similar plants
7. LRA
8. References listed by applicant for each TLAA
9. NEI 95-10, Section 5.1 and Table 6.2-2
10. Basis documents
11. Implementation documents
12. Operating experience reports (plant-specific and industry)
13. Lessons-learned developed by RLRC
14. Applicant’s UFSAR

E. In addition, the project team will also review the TLAAs to determine if there are emerging issues that should be further evaluated by technical specialists in the NRC Divisions of Component Integrity (DCI) or the Division of Engineering (DE). This is not expected to be an issue for TLAAs for which the applicant claims consistency with 10 CFR 54.21(c)(i) “the analyses remain valid for the period of extended operation.” or 10 CFR 54.21(c)(iii) “the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.” For TLAAs for which the applicant claims consistency with 10 CFR 54.21(c)(ii) - “the analyses have been projected to the end of the period of extended operation,” the

audit team leader will be consulted to determine which TLAAs the audit team will be capable of reviewing. Consideration should be given to team expertise, past precedent, and complexity of the provided analysis. Candidates for further review by technical specialists could be such as the following:

1. Reactor Vessel Neutron Embrittlement Analysis (IP2 and IP3 LRA Section 4.2)

Audit/Review

A. Confirm that each IP2 and IP3 TLAA listed in this section is appropriate. Refer to any analyses and evaluations created during the acceptance review process.

B. If a TLAA is listed in the SRP-LR or NEI 95-10 and not in its LRA, the IP2 and IP3 should state in this section that it does not apply.

C. Review any industry and plant-specific operating experience associated with the TLAA. This is an area of review emphasis. The project team members should consider the following industry guidance (from NEI 95-10, Table 6.2-2) as follows:

1. The application shall include a list of time-limited aging analyses, as defined by §54.3. The application should include the identification of the affected systems, structures, and components, an explanation of the time dependent aspects of the calculation or analysis, and a discussion of the TLAA's impact on the associated aging effect. The identification of the results of the time-limited aging analysis review, which may be provided in tabular form, may reference the section in the Integrated Plant Assessment-Aging Management Review chapter where more details of the actual review and disposition (as required by §54.21(c)(1)(i)-(iii)) are located.

2. The application shall include a demonstration that (1) the analyses remain valid for the period of extended operation, (2) the analyses have been (or have been identified and will be) projected to the end of the period of extended operation or (3) the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

3. The application shall include a list of plant-specific exemptions granted pursuant to §50.12 and in effect that are based on TLAAs as defined in §54.3. The application shall include an evaluation that justifies the continuation of these exemptions for the period of extended operation.

4. Summary descriptions of the evaluations of TLAAs for the period of extended operation shall be included in the UFSAR supplement (Appendix A).

D. If it is necessary to ask the applicant a question to clarify the basis for their analyses, follow the logic process shown in Figure 4 of this audit and review plan.

E. If it is necessary for the applicant to submit additional information to support the basis for the conclusions in their TLAA, the applicant may agree to voluntarily submit the required information as a supplement (docketed letter submitted under oath and affirmation) to the IP2 and IP3 LRA. If not, the NRC may issue an RAI to obtain the information.

6.4.2 Metal Fatigue Analyses

Figure 4, "Evaluation of TLAAs and Exemptions," taken from NEI 95-10, Revision 6, shows the process of evaluating and reviewing TLAAs and also identifying the exemptions in effect. This process flowchart shows the activities and decisions used to audit/review each TLAA that the applicant identifies.

Pre-Review Preparation

A. The project team will determine if the TLAAs identified in the IP2 and IP3 LRA to be within the NUREG-1800 TLAA category of "metal fatigue" have provided adequate information to meet the requirements of 10 CFR 54.21(c)(1) and 10 CFR 54.21(c)(2).

B. Identify and locate the documents needed to perform the review. These may include, but are not limited to, the following:

1. Excel database on TLAAs summarizing how earlier LRAs and SERs presented and reviewed TLAAs
2. GALL Report, especially Section X.M1
3. SRP-LR
4. ISG-LR
5. RAIs, audit and review reports, and SERs for similar plants
6. LRA
7. References listed by applicant for each TLAA
8. NEI 95-10, Section 5.1 and Table 6.2-2
9. Basis documents
10. Implementation documents
11. Operating experience reports (plant-specific and industry)
12. Lessons-learned developed by RLRC
13. Applicant's UFSAR

C. In addition, the project team will also review the IP2 and IP3 TLAAs within the NUREG-1800 TLAA category of "metal fatigue" to determine if there are emerging issues that should be further evaluated by technical specialists in the NRC Divisions of Component Integrity (DCI) or the Division of Engineering (DE). This is not expected to be an issue for TLAAs for which the applicant claims consistency

with 10 CFR 54.21(c)(i) “the analyses remain valid for the period of extended operation.” or 10 CFR 54.21(c)(iii) “the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.” For TLAAs for which the applicant claims consistency with 10 CFR 54.21(c)(ii) - “the analyses have been projected to the end of the period of extended operation,” the audit team leader will be consulted to determine which TLAAs the audit team will be capable of reviewing. Consideration should be given to team expertise, past precedent, and complexity of the provided analysis.

Audit/Review

A. Confirm that each IP2 and IP3 TLAA listed in this section is appropriate. Refer to any analyses and evaluations created during the acceptance review process.

B. If a TLAA is listed in the SRP-LR or NEI 95-10 and not in its LRA, the IP2 and IP3 should state in this section that it does not apply.

C. The project team will conduct both regulatory evaluations and technical evaluations to determine, as defined in 10 CFR 54.3, that each TLAA meets the following six criteria:

1. Involve systems, structures, and components that are within the scope of license renewal, as delineated in 10 CFR 54.4(a).

2. Consider the effects of aging.

3. Involve time-limited assumptions defined by the current operating term (40 years).

4. Determined to be relevant by the applicant in making a safety determination.

5. Involve conclusions, or provide the basis for conclusions, related to the capability of the system, structure, and component to perform its intended functions, as delineated in 10 CFR 54.4(b).

6. Contained or incorporated by reference in the CLB.

D. The project team will ascertain that the IP2 and IP3 satisfactorily demonstrates that (1) the analyses remain valid for the period of extended operation, (2) the analyses have been (or have been identified and will be) projected to the end of the period of extended operation or (3) the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

E. Review any industry and plant-specific operating experience associated with the TLAA. This is an area of review emphasis. The project team members should

consider the following industry guidance on metal fatigue (from NEI 95-10, Table 6.2-2) as follows:

1. Disposition chosen for each of the identified TLAAs. Also, provide a reference to the summary description of TLAA evaluations in the FSAR supplement (Appendix A). Use hypertext to link to the appropriate location in the appendix for electronic submittals [§54.21(c)(1) and §54.21(d)1.

F. If it is necessary to ask the applicant a question to clarify the basis for their analyses, follow the logic process shown in Figure 4 of this audit and review plan.

G. If it is necessary for the applicant to submit additional information to support the basis for the conclusions in their TLAA, the applicant may agree to voluntarily submit the required information as a supplement (docketed letter submitted under oath and affirmation) to the IP2 and IP3 LRA. If not, the NRC may issue an RAI to obtain the information.

6.4.3 Environmental Qualification Analyses for Electrical Components

Figure 5, “Evaluation of TLAAs and Exemptions,” taken from NEI 95-10, Revision 6, shows the process of evaluating and reviewing TLAAs and also identifying the exemptions in effect. This process flowchart shows the activities and decisions used to audit/review each TLAA that the applicant identifies.

Pre-Review Preparation

A. The project team will determine if the TLAAs identified in the IP2 and IP3 LRA to be within the NUREG-1800 TLAA category of “environmental qualification of electric equipment” have provided adequate information to meet the requirements of 10 CFR 54.21(c)(1) and 10 CFR 54.21(c)(2).

B. Identify and locate the documents needed to perform the review. These may include, but are not limited to, the following:

1. Excel database on TLAAs summarizing how earlier LRAs and SERs presented and reviewed TLAAs
2. GALL Report, especially Section X.E1
3. SRP-LR
4. ISG-LR
5. RAIs, audit and review reports, and SERs for similar plants
6. LRA
7. References listed by applicant for each TLAA
8. NEI 95-10, Section 5.1 and Table 6.2-2
9. Basis documents
10. Implementation documents
11. Operating experience reports (plant-specific and industry)

12. Lessons-learned developed by RLRC
13. Applicant's UFSAR

C. In addition, the project team will also review the IP2 and IP3 TLAAs within the NUREG-1800 TLAA category of "environmental qualification of electric equipment" to determine if there are emerging issues that should be further evaluated by technical specialists in the NRC Divisions of Component Integrity (DCI) or the Division of Engineering (DE). This is not expected to be an issue for TLAAs for which the applicant claims consistency with 10 CFR 54.21(c)(i) "the analyses remain valid for the period of extended operation." or 10 CFR 54.21(c)(iii) "the effects of aging on the intended function(s) will be adequately managed for the period of extended operation." For TLAAs for which the applicant claims consistency with 10 CFR 54.21(c)(ii) - "the analyses have been projected to the end of the period of extended operation," the audit team leader will be consulted to determine which TLAAs the audit team will be capable of reviewing. Consideration should be given to team expertise, past precedent, and complexity of the provided analysis.

Audit/Review

A. Confirm that each IP2 and IP3 TLAA listed in this section is appropriate. Refer to any analyses and evaluations created during the acceptance review process.

B. If a TLAA is listed in the SRP-LR or NEI 95-10 and not in its LRA, the IP2 and IP3 should state in this section that it does not apply.

C. The project team will conduct both regulatory evaluations and technical evaluations to determine, as defined in 10 CFR 54.3, that each TLAA meets the following six criteria:

1. Involve systems, structures, and components that are within the scope of license renewal, as delineated in 10 CFR 54.4(a).

2. Consider the effects of aging.

3. Involve time-limited assumptions defined by the current operating term (40 years).

4. Determined to be relevant by the applicant in making a safety determination.

5. Involve conclusions, or provide the basis for conclusions, related to the capability of the system, structure, and component to perform its intended functions, as delineated in 10 CFR 54.4(b).

6. Contained or incorporated by reference in the CLB.

D. The project team will ascertain that the IP2 and IP3 satisfactorily demonstrates that (1) the analyses remain valid for the period of extended operation, (2) the analyses have been (or have been identified and will be) projected to the end of the period of extended operation or (3) the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

E. Review any industry and plant-specific operating experience associated with the TLAA. This is an area of review emphasis. The project team members should consider the following industry guidance on environmental qualification of electric equipment (from NEI 95-10, Table 6.2-2) as follows:

1. Disposition chosen for each of the identified TLAAs. Also, provide a reference to the summary description of TLAA evaluations in the FSAR supplement (Appendix A). Use hypertext to link to the appropriate location in the appendix for electronic submittals [§54.21(c)(1) and §54.21(d)1].

F. If it is necessary to ask the applicant a question to clarify the basis for their analyses, follow the logic process shown in Figure 4 of this audit and review plan.

G. If it is necessary for the applicant to submit additional information to support the basis for the conclusions in their TLAA, the applicant may agree to voluntarily submit the required information as a supplement (docketed letter submitted under oath and affirmation) to the IP2 and IP3 LRA. If not, the NRC may issue an RAI to obtain the information.

6.4.4 Other Plant-Specific TLAAs

Figure 4, “Evaluation of TLAAs and Exemptions,” taken from NEI 95-10, Revision 6, shows the process of evaluating and reviewing TLAAs and also identifying the exemptions in effect. This process flowchart shows the activities and decisions used to audit/review each TLAA that the applicant identifies.

Pre-Review Preparation

A. The project team will determine if the TLAAs identified in the IP2 and IP3 LRA to be within the NUREG-1800 TLAA category of “other plant-specific TLAAs” have provided adequate information to meet the requirements of 10 CFR 54.21(c)(1) and 10 CFR 54.21(c)(2).

B. Identify and locate the documents needed to perform the review. These may include, but are not limited to, the following:

1. Excel database on TLAAs summarizing how earlier LRAs and SERs presented and reviewed TLAAs
2. GALL Report

3. SRP-LR
4. ISG-LR
5. RAIs, audit and review reports, and SERs for similar plants
6. LRA
7. References listed by applicant for each TLAA
8. NEI 95-10, Section 5.1 and Table 6.2-2
9. Basis documents
10. Implementation documents
11. Operating experience reports (plant-specific and industry)
12. Lessons-learned developed by RLRC
13. Applicant's UFSAR

C. In addition, the project team will also review the IP2 and IP3 TLAAs within the NUREG-1800 TLAA category of "other plant-specific TLAAs" to determine if there are emerging issues that should be further evaluated by technical specialists in the NRC Divisions of Component Integrity (DCI) or the Division of Engineering (DE). This is not expected to be an issue for TLAAs for which the applicant claims consistency with 10 CFR 54.21(c)(i) "the analyses remain valid for the period of extended operation." or 10 CFR 54.21(c)(iii) "the effects of aging on the intended function(s) will be adequately managed for the period of extended operation." For TLAAs for which the applicant claims consistency with 10 CFR 54.21(c)(ii) - "the analyses have been projected to the end of the period of extended operation," the audit team leader will be consulted to determine which TLAAs the audit team will be capable of reviewing. Consideration should be given to team expertise, past precedent, and complexity of the provided analysis.

Audit/Review

A. Confirm that each IP2 and IP3 TLAA listed in this section is appropriate. Refer to any analyses and evaluations created during the acceptance review process.

B. If a TLAA is listed in the SRP-LR or NEI 95-10 and not in its LRA, the IP2 and IP3 should state in this section that it does not apply.

C. The project team will conduct both regulatory evaluations and technical evaluations to determine, as defined in 10 CFR 54.3, that each TLAA meets the following six criteria:

1. Involve systems, structures, and components that are within the scope of license renewal, as delineated in 10 CFR 54.4(a).

2. Consider the effects of aging.

3. Involve time-limited assumptions defined by the current operating term (40 years).

4. Determined to be relevant by the applicant in making a safety determination.

5. Involve conclusions, or provide the basis for conclusions, related to the capability of the system, structure, and component to perform its intended functions, as delineated in 10 CFR 54.4(b).

6. Contained or incorporated by reference in the CLB.

D. The project team will ascertain that the IP2 and IP3 satisfactorily demonstrates that (1) the analyses remain valid for the period of extended operation, (2) the analyses have been (or have been identified and will be) projected to the end of the period of extended operation or (3) the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

E. Review any industry and plant-specific operating experience associated with the TLAA. This is an area of review emphasis. The project team members should consider the following industry guidance on “other plant-specific TLAAs” (from NEI 95-10, Table 6.2-2) as follows:

1. Identify and evaluate any plant-specific TLAAs.

F. If it is necessary to ask the applicant a question to clarify the basis for their analyses, follow the logic process shown in Figure 4 of this audit and review plan.

G. If it is necessary for the applicant to submit additional information to support the basis for the conclusions in their TLAA, the applicant may agree to voluntarily submit the required information as a supplement (docketed letter submitted under oath and affirmation) to the IP2 and IP3 LRA. If not, the NRC may issue an RAI to obtain the information.

6.5 Audit and Safety Review Documentation

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

6.5.1 Audit and Review Summary

The project team should prepare an audit and review summary upon completion of the on-site audits and reviews of the AMPs, AMRs, and TLAAs assigned to the project team. This summary should provide the following information:

- Members who participated in the on-site audits,
- Dates and location of the audits

- Guidance documents used for the review
- Activities performed
- Documents reviewed
- Availability of question and answer database
- Status of the review

6.5.2 Safety Evaluation Report Input

A. General guidance

1. Each project team member should prepare the SER input for the AMP and AMR audits and reviews that he or she performed. The technical assistance contractor shall collect, assemble, and prepare the complete SER input.

2. In general, the data and information needed to prepare the SER input should be available in the project team's audit and review question and answer database and the team member's worksheets.

3. SER inputs are to be prepared for:

a. Each AMP that was determined to be consistent with the GALL Report, which has no exceptions or enhancements.

b. Each 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.

c. Each plant-specific AMP.

d. AMRs that are consistent with the GALL Report, for which no further evaluation is recommended.

e. AMRs that are consistent with the GALL Report, for which further evaluation is recommended.

f. Project team AMR review results.[3]

4. 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] AMRs that are not consistent with the GALL Report or not addressed in the GALL Report.

3.0 Applicant's Use of the Generic Aging Lessons Learned Report
- 3.01 Format of the LRA
- 3.02 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[4] Aging Management of _____
- 3.X.1 Summary of Technical Information in the Application
- 3.X.2 Staff Evaluation
  - 3.X.2.1 Aging Management Evaluations that are Consistent with the GALL Report, for Which Further Evaluation is Not Required
  - 3.X.2.2 Aging Management Evaluations that are Consistent with the GALL Report, for Which Further Evaluation is Recommended
  - 3.X.2.3 AMR Results that are Not Consistent with or Not Addressed in the GALL Report
- 3.X.3 Conclusion

4.0 Time-Limited Aging Analyses
- 4.1 Identification of Time-Limited Aging Analyses
- 4.3 Metal Fatigue

[4] 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 systems, (3) Section 3.3, auxiliary systems, (4) Section 3.4, steam power and conversion systems, (5) Section 3.5, structures and component supports, (6) Section 3.6, electrical and instrumentation and controls.

4.4 Environmental Qualification of Electrical Components
4.5 Concrete Containment Tendon Prestress
4.6 Containment Liner Plate and Penetrations Fatigue Analyses
4.7 Other Plant-Specific Time-Limited Aging Analyses
4.7.1 Reactor Coolant Pump Flywheel Analysis
4.7.2 Leak Before Break
4.7.3 Steam Generator Flow Induced Vibration and Tube Wear
4.8 Conclusion for Time-Limited Aging Analyses

5. For each AMP audited/reviewed by the project team, the SER shall include a discussion of the team's review of the operating experience program element.

6. If the applicant submitted an amendment or 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.

7. 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.

8. 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.

B. SER input

1. For 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 LRA) is acceptable. This SER input documents that the AMP is consistent with the GALL Report.

2. For 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 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.

3. For plant-specific AMPs, the SER input should document the basis for accepting each of the ten elements reviewed by the project team. The SER input should also include a discussion concerning the adequacy of the UFSAR supplement.

4. For aging management evaluations that are consistent with the GALL Report,[5] the SER input should include the following:

   a. Identify the LRA section reviewed.

   b. A summary of the type of information provided in the section of the LRA reviewed, including a listing of the AMPs reviewed.

   c. Identify the LRA Tables 3.X.2-Y reviewed.

   d. A summary review of the AMR Notes A through E used to classify the AMR line items used in these tables.

   e. 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.

   f. The bases for accepting any exceptions to GALL AMRs that were identified by the applicant or the project team member.

   g. A finding that verifies that:

      - The applicant identified the applicable aging effects.
      - The applicant defined the appropriate combination of materials and environments.
      - The applicant specified acceptable AMPs.

   h. 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.

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

5. For aging management evaluations that are consistent with the GALL Report, for which further evaluation is recommended, the SER input should include the following:

   a. The LRA section containing the applicant's further evaluations of AMRs for which further evaluation is required.

   b. A list of the aging effects for which the further evaluation apply.

   c. For the applicant's further evaluations, provide a summary of the basis for concluding that it satisfied the criteria of Section 3.x.3.2 of the SRP-LR.

   d. A statement that the staff audited the applicant's further evaluations against the criteria contained in Section 3.x.3.2 of the SRP-LR.

6. Staff AMR Review Results.[6] 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:

   a. The LRA section reviewed.

   b. 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.

   c. Identify the LRA Tables 3.X.2-Y documented by this audit writeup.

   d. A brief summary of what the staff (project team) reviewed (i.e., LRA and applicant basis documents and other implementation documents).

   e. A finding that verifies, if true, that:

      - The applicant identified the applicable aging effects.

      - The applicant listed the appropriate combination of materials and environments.

      - The applicant specified acceptable AMPs.

   f. Provide a conclusion stating, if applicable, that the applicant has demonstrated that the effects of aging will be adequately managed

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

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.

7. TLAA Reviews - This section of the SER input documents the reviews of TLAAs assigned to the project team. The SER input should include the following:

   a. Summary of technical information in the application

   b. Staff evaluation
      (i) Regulatory basis
      (ii) Scope of review and technical evaluation

   c. UFSAR supplement review - stating, if applicable, that the applicant has provided a UFSAR supplement summary description of its TLAA evaluation.

   d. Provide a conclusion stating, if applicable, that the applicant has demonstrated that TLAAs that are for which the applicant claims consistency with 10 CFR 54.21(c)(i) “the analyses remain valid for the period of extended operation,” or 10 CFR 54.21(c)(ii) “the analyses have been projected to the end of the period of extended operation,” or 10 CFR 54.21(c)(iii) “the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.” The staff also concludes that the UFSAR supplement contains an appropriate summary description of the activities for managing the effects of aging and the TLAA evaluation, as required by 10 CFR 54.21(d).

6.6 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 SER input.

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

After the NRC has made its licensing decision, all copies of documents collected and all documents generated to complete the SER input, 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.

Table 2. Notes for License Renewal Application Tables 3.X.2-Y[7]

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.

[7] 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).

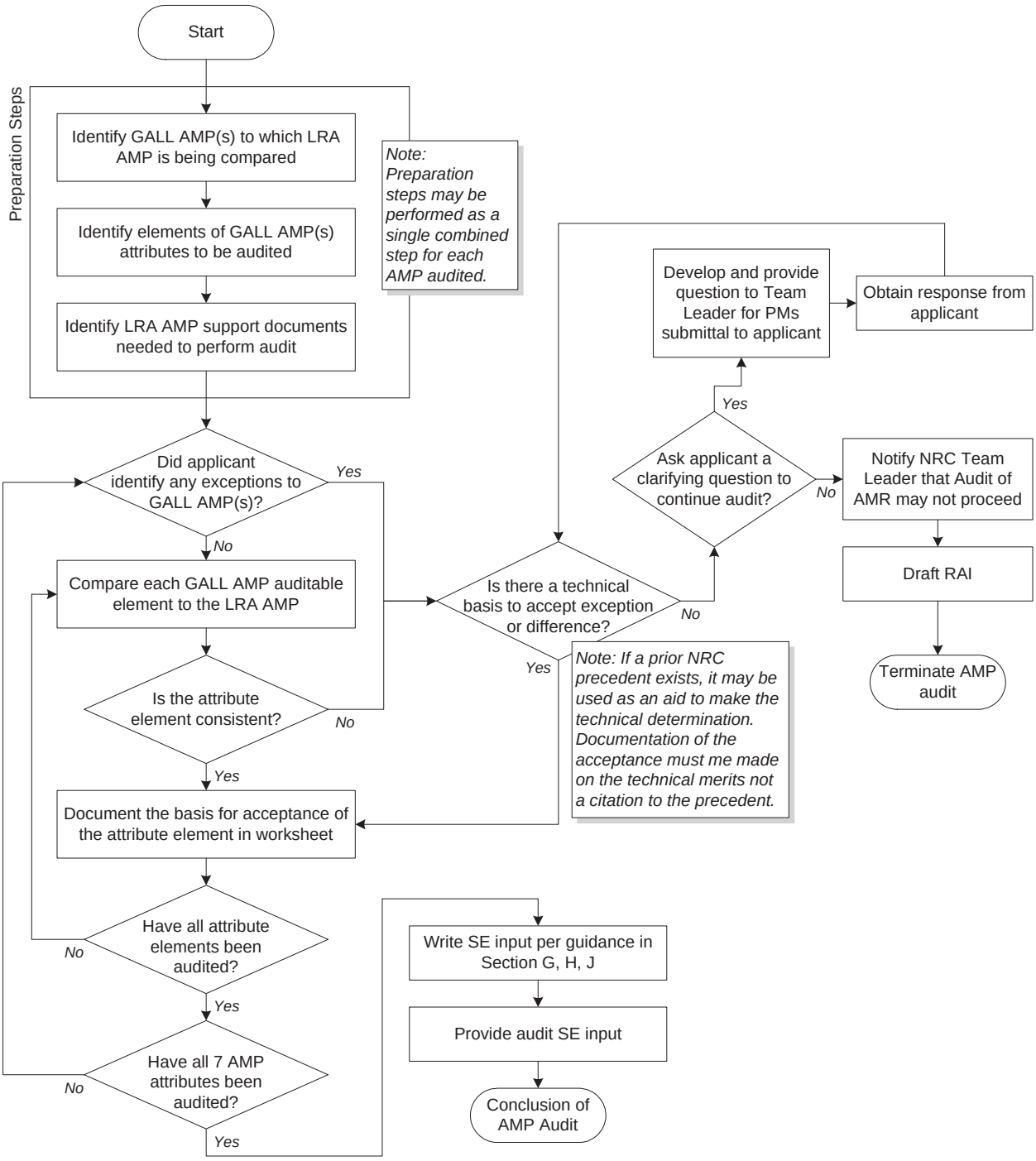

Figure 1. Audit of AMPs that are Consistent with the GALL Report

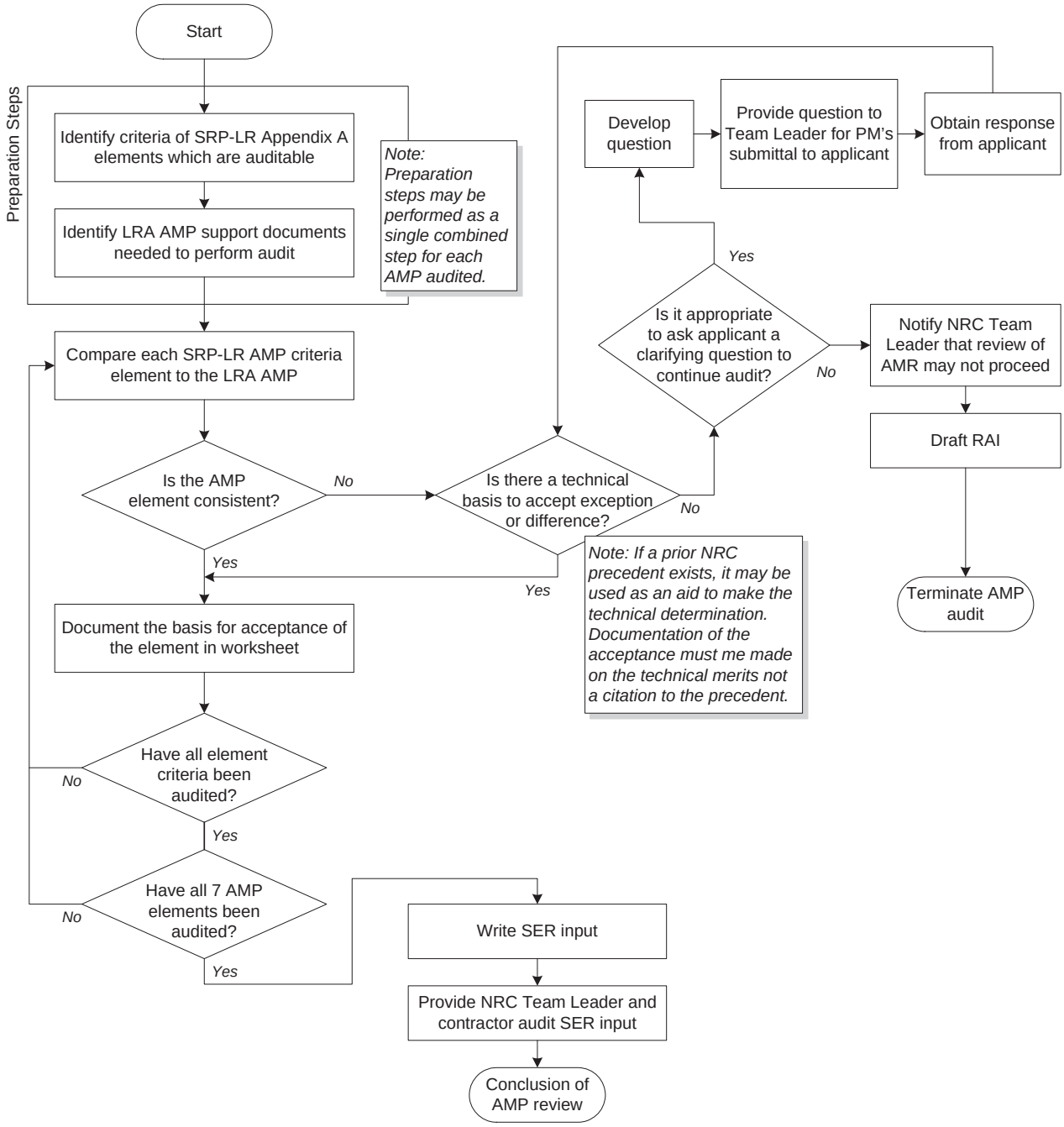

Figure 2. Audit of Plant-Specific AMPs

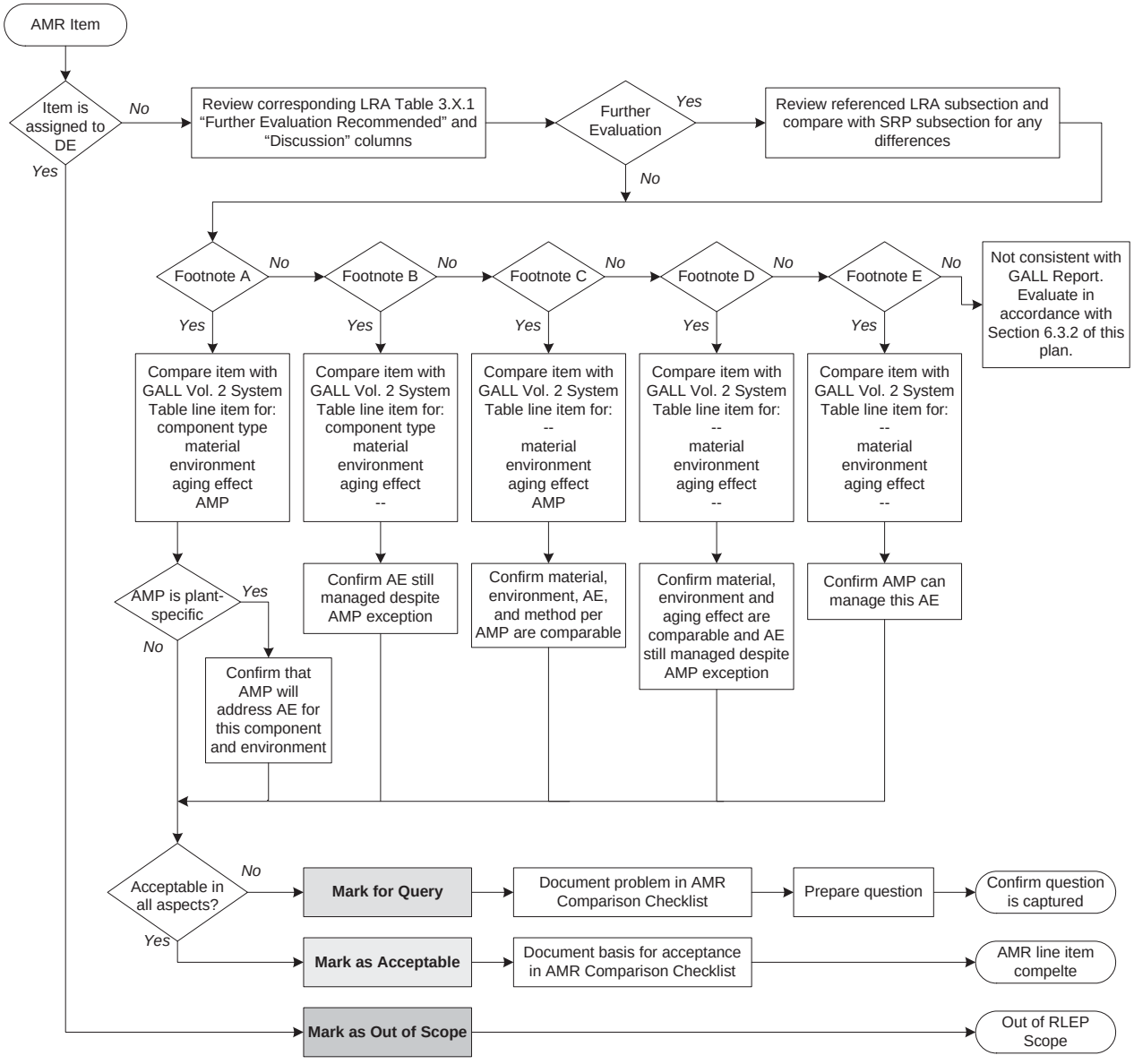

Figure 3. Review of AMRs that are Consistent with the GALL Report

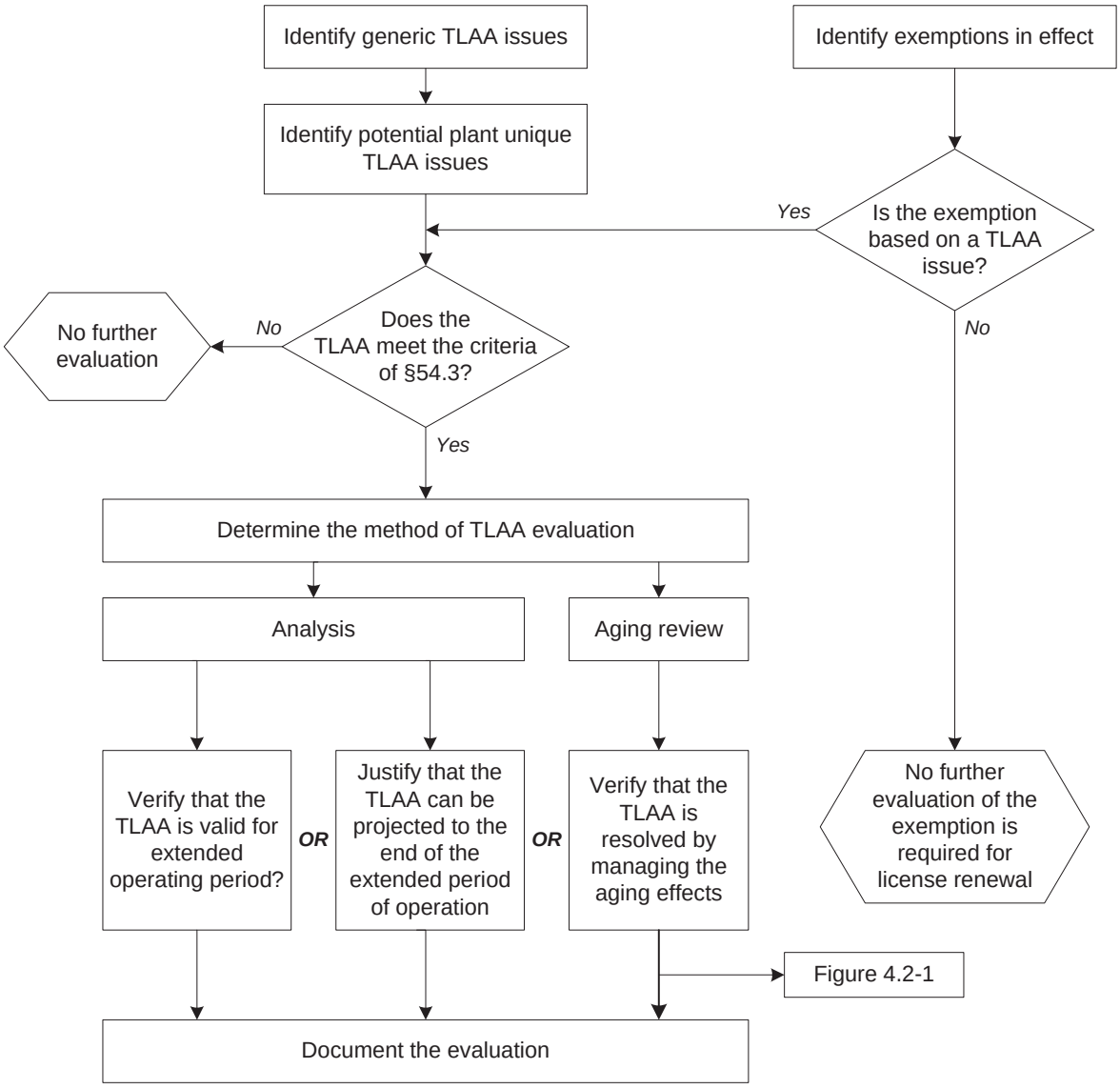

Figure 4. Review of TLAAs and Exemptions (from NEI 95-10, Revision 6)

APPENDIX A

PROJECT TEAM MEMBERSHIP

Organization	Name	Function
NRC/NRR/DLR/RLRC	Jim Davis	Team Leader
NRC/NRR/DLR/RLRC	Peter Wen	Back-up Team Leader
NRC/NRR/DLR/RLRC	John Fair	Reviewer - Mechanical
NRC/NRR/DLR/RLRC	Yeon-Ki Chung	Reviewer – Mechanical
NRC/NRR/DLR/RLRC	Qi Gan	Reviewer – Mechanical
NRC/NRR/DLR/RLRC	Duc Nguyen	Reviewer – Electrical
NRC/NRR/DLR/RLRC	Surinder Arora	Reviewer – Mechanical
BNL	Rich Morante	Contractor lead, Reviewer – Structures
BNL	Joe Braverman	Reviewer – Structures
BNL	Mano Subudhi	Reviewer – Materials
BNL	Ken Sullivan	Reviewer – Mechanical

APPENDIX B

RLRC SCHEDULE FOR IP2 AND IP3 LRA SAFETY REVIEW

Plant:	Indian Point Nuclear Generating Unit Nos. 2 and 3	**TAC:**	MD5407, MD5408
Team Leader:	Jim Davis	**Scope of Work:**	
Backup Team Leader:	Peter Wen	**AMPs -**	All, with exception of Rx Vessel Surv, Ni Alloy Insp, Borel, and Fire Protection
Project Manager:	Kimberly Green	**TLAAs -**	4.1, 4.3 , 4.4, and 4.6
Contractor:	BNL	**AMRs -**	All
Team Members:		**RAI Target Date:**	12/31/2007
NRC: Surinder Arora, Yeon-Ki Chung, John Fair, Qi Gan, and Duc Nguyen		**SE Input to PM:**	3/31/2008
BNL: Joe Braverman, Rich Morante, Mano Subudhi, and Ken Sullivan			

	Activity/Milestone	Scheduled Date
1	Received license renewal application (LRA)	4/30/07
2	Complete acceptance review	5/31/07
3	Make review assignments (RLRA Project Manager)	6/15/07
4	Conduct team planning and kick-off meeting	6/29/07
5	Issue audit plan to Project Manager	8/1/07
6	Conduct first site visit (AMP/TLAA audit and review)	8/27-31/2007
7	Draft AMP Audit Report Input	9/27/07
8	Conduct in-office AMR reviews	9/4/07 to 10/12/07
9	Conduct second site visit (AMR/TLAA audit and review)	10/22-26/2007
10	Optional Third site visit to resolve AMR, AMP, and TLAA questions	11/26-28/2007
11	Draft AMR/TLAA SER Input	12/5/07
12	Cutoff for providing RAIs to Project Manager	12/31/07
13	Peer Review of SER Input	12/10-21/07
14	Issue Audit Summary to PM	2/29/08
15	Issue final SER input to Project Manager	3/31/08
16	ACRS subcommittee meeting	July 2008
17	ACRS full committee meeting	November 2008

* Note: The date for PM to issue SER with open items is 5/30/08.

APPENDIX C

AGING MANAGEMENT PROGRAM ASSIGNMENTS

No.	IP2 and IP3 LRA AMP Number	GALL Report AMP Number	IP2 and IP3 Aging Management Program	Plant Specific	Consistent With GALL?			Assigned Auditor
						Exceptions	Enhancements	
1	B.1.1	XI.M29	Aboveground Steel Tanks (existing program)		X		X	Q. Gan/J. Davis
2	B.1.2	XI.M18	Bolting Integrity(existing program)		X		X	Q. Gan/J. Davis
3	B.1.3	XI.M22	Boraflex Monitoring(existing program)			X		DCI Staff
4	B.1.4	NA	Boral Surveillance (existing program)	X				DCI Staff
5	B.1.5	XI.M10	Boric Acid Corrosion prevention(existing program)		X			J. Davis
6	B.1.6	XI.M34	Buried Piping and Tanks Inspection (new program)		X			Q. Gan/J. Davis

No.	IP2 and IP3 LRA AMP Number	GALL Report AMP Number	IP2 and IP3 Aging Management Program	Plant Specific	Consistent With GALL?			Assigned Auditor
						Exceptions	Enhancements	
7	B.1.7	XI.S4	Containment Leak Rate (existing program)		X			J. Braverman/ R. Morante
8	B.1.8	XI.S1, XI.S2	Containment Inservice Inspection (existing program)	X				J. Braverman/ R. Morante
9	B.1.9	XI.M30	Diesel Fuel Monitoring (existing program)			X	X	K. Sullivan
10	B.1.10	X.E1	Environmental Qualification (EQ) of Electric Components (existing program)		X			D. Nguyen
11	B.1.11	XI.M36	External surfaces Monitoring (existing program)		X		X	K. Green
12	B.1.12	X.M1	Fatigue Monitoring (existing program)			X	X	P. Wen
13	B.1.13	XI.M26	Fire Protection(existing program)			X	X	N. Iqbal

No.	IP2 and IP3 LRA AMP Number	GALL Report AMP Number	IP2 and IP3 Aging Management Program	Plant Specific	Consistent With GALL?			Assigned Auditor
						Exceptions	Enhancements	
14	B.1.14	XI.M27	Fire Water System (existing program)			X	X	N. Iqbal
15	B.1.15	XI.M17	Flow-Accelerating Corrosion (existing program)		X			S. Arora
16	B.1.16	XI.M37	Flux Thimble Tube Inspection (existing program)		X		X	M. Subudhi
17	B.1.17	NA	Heat Exchanger Monitoring (existing program)	X				J. Braverman/ R. Morante
18	B.1.18	XI.M1, XI.S3	Inservice Inspection (existing program)	X				M. Subudhi
19	B.1.19	XI.S5	Masonry Wall (existing program)		X		X	J. Braverman/ R. Morante
20	B.1.20	XI.E4	Metal-Enclosed Bus Inspection (existing program)			X	X	D. Nguyen
21	B.1.21	NA	Nickel Alloy Inspection (existing program)	X				DCI Staff

No.	IP2 and IP3 LRA AMP Number	GALL Report AMP Number	IP2 and IP3 Aging Management Program	Plant Specific	Consistent With GALL?			Assigned Auditor
						Exceptions	Enhancements	
22	B.1.22	NA	Non-EQ Bolted Cable Connections (new program)	X				D. Nguyen
23	B.1.23	XI.E3	Non-EQ Inaccessible Medium-Voltage Cable (new program)		X			D. Nguyen
24	B.1.24	XI.E2	Non-EQ Instrumentation Circuits Test Review (new program)		X			D. Nguyen
25	B.1.25	XI.E1	Non-EQ Insulated Cables and Connections (new program)		X			D. Nguyen
26	B.1.26	XI.M39	Oil Analysis (existing program)			X	X	K. Sullivan
27	B.1.27	XI.M32	One-Time Inspection (new program)		X			S. Arora

No.	IP2 and IP3 LRA AMP Number	GALL Report AMP Number	IP2 and IP3 Aging Management Program	Plant Specific	Consistent With GALL?			Assigned Auditor
						Exceptions	Enhancements	
28	B.1.28	XI.M35	One-time Inspection – Small Bore Piping (new program)		X			S. Arora
29	B.1.29	NA	Periodic Surveillance and Preventive Maintenance (existing program)	X				S. Arora
30	B.1.30	XI.M3	Reactor Head Closure Studs (existing program)		X			M. Subudhi
31	B.1.31	XI.M11A	Reactor Vessel Head Penetration Inspection (existing program)		X			M. Subudhi
32	B.1.32	XI.M31	Reactor Vessel Surveillance (existing program)		X		X	DCI Staff
33	B.1.33	XI.M33	Selective Leaching (new program)		X			J. Davis
34	B.1.34	XI.M20	Service Water Integrity (existing program)		X			K. Sullivan

No.	IP2 and IP3 LRA AMP Number	GALL Report AMP Number	IP2 and IP3 Aging Management Program	Plant Specific	Consistent With GALL?			Assigned Auditor
						Exceptions	Enhancements	
35	B.1.35	XI.M19	Steam Generator Integrity (existing program)		X		X	Q. Gan/J. Davis
36	B.1.36	XI.S6 (XI.S7)	Structures Monitoring (existing program)		X		X	J. Braverman/ R. Morante
37	B.1.37	XI.M12	Thermal Aging embrittlement of Cast Austenitic Stainless Steel (CASS) (new program)		X			M. Subudhi
38	B.1.38	XI.M13	Thermal Aging and Neuron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) (new program)		X			M. Subudhi
39	B.1.39	NA	Water Chemistry Control – Auxiliary Systems (existing program)	X				K. Sullivan

No.	IP2 and IP3 LRA AMP Number	GALL Report AMP Number	IP2 and IP3 Aging Management Program	Plant Specific	Consistent With GALL?			Assigned Auditor
						Exceptions	Enhancements	
40	B.1.40	XI.M21	Water Chemistry Control – Closed Cooling Water (existing program)			X	X	K. Sullivan
41	B.1.41	XI.M2	Water Chemistry Control – Primary and Secondary (existing program)		X		X	S. Arora

APPENDIX D

AGING MANAGEMENT REVIEW ASSIGNMENTS

Aging Management Reviews		Reviewer
3.1	Aging Management of Reactor Vessel, Internals, and Reactor Coolant System	Mano Subudhi
3.2	Aging Management of Engineered Safety Features	Qi Gan/Peter Wen
3.3	Aging Management of Auxiliary Systems	Ken Sullivan /Rich Morante
3.4	Aging Management of Steam and Power Conversion Systems	Surinder Arora
3.5	Aging Management of Containment, Structures, and Component Supports	Joe Braverman / Rich Morante
3.6	Aging Management of Electrical and Instrumentation and Controls	Duc Nguyen

The applicant presented the (a)(2) items (Nonsafety-Related Components Potentially Affecting Safety Functions) all in Tables 3.3.2-19-X of AMR Section 3.3. However, the SER preparation is based on systems as defined in SRP-LR, which includes six specific sections (i.e., AMRs 3.1 thru 3.6). To facilitate the LRA review and SER preparation, the following (a)(2) items in Section 3.3 are reassigned to Sections 3.2 and 3.4 reviewers as followed:

Peter Wen (3.2 Reviewer)

IP3:	Table 3.3.2-19-10	IP2:	Table 3.3.2-19-30
	Table 3.3.2-19-43		Table 3.3.2-19-37
	Table 3.3.2-19-44		
	Table 3.3.2-19-53		
	Table 3.3.2-19-62		

Surinder Arora (3.4 Reviewer)

IP3:	Table 3.3.2-19-6	IP2:	Table 3.3.2-19-4
	Table 3.3.2-19-7		Table 3.3.2-19-6
	Table 3.3.2-19-8		Table 3.3.2-19-12
	Table 3.3.2-19-9		Table 3.3.2-19-15
	Table 3.3.2-19-12		Table 3.3.2-19-23
	Table 3.3.2-19-14		Table 3.3.2-19-34
	Table 3.3.2-19-15		Table 3.3.2-19-36
	Table 3.3.2-19-18		Table 3.3.2-19-41
	Table 3.3.2-19-22		
	Table 3.3.2-19-23		
	Table 3.3.2-19-24		
	Table 3.3.2-19-27		
	Table 3.3.2-19-28		
	Table 3.3.2-19-32		
	Table 3.3.2-19-34		
	Table 3.3.2-19-35		
	Table 3.3.2-19-36		
	Table 3.3.2-19-45		
	Table 3.3.2-19-50		
	Table 3.3.2-19-51		
	Table 3.3.2-19-57		

APPENDIX E

TIME-LIMITED AGING ANALYSIS REVIEW ASSIGNMENTS

LRA TLAA Number	TLAA Title	10 CFR 54.21(c)(1)		Assigned Reviewer
		(i) or (iii)	(ii)	
4.1	Identification of TLAAs and Exemptions			Qi Gan/ Peter Wen/ John Fair
4.2	Reactor Vessel Neutron Embrittlement	(iii)	(ii)	**DCI**
4.3	Metal Fatigue	(i) or (iii)		Qi Gan/ Peter Wen/ John Fair
4.4	Environmental Qualification of Electrical Components	(iii)		D. Nguyen
4.5	Concrete Containment Tendon Prestress Analysis	N/A	-	-
4.6	Containment Liner Plate and Penetrations Fatigue Analysis	IP2- (i) IP3- N/A		J.Braverman/ R. Morante
	Other Plant-Specific TLAA			
4.7.1	Reactor Coolant Pump Flywheel Analysis	N/A		DCI
4.7.2	Leak Before Break	(i)		DCI
4.7.3.	Steam generator Flow Induced Vibration and Tube Wear	IP2- (i)	IP3- (ii)	DCI

APPENDIX F

CONSISTENT WITH GALL REPORT AMP AUDIT/REVIEW WORKSHEET

The worksheet provided in this appendix provides, as an aid for the reviewer, a process for documenting the basis for the assessment of the elements and sub-elements contained in the GALL Report AMPs (Chapter XI of NUREG-1801, Volume 2). The worksheet provides 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 safety evaluation report input.

A complete set of GALL Report AMP worksheets can be found using ADAMS.

LRA Appendix Subsection:	LRA AMP Title:
GALL Report Subsection:	Gall Report Title:

A. Element Review and Audit

Program Description:
☐ Consistent with GALL Report ☐ Difference Identified
Discussion:

1. Scope of Program:
☐ Consistent with GALL Report ☐ Exception ☐ Enhancement ☐ Difference Identified
Discussion:

2. Preventive Action:
☐ Consistent with GALL Report ☐ Exception ☐ Enhancement ☐ Difference Identified
Discussion:

3. Parameters Monitored/Inspected:
☐ Consistent with GALL Report ☐ Exception ☐ Enhancement ☐ Difference Identified
Discussion:

4. Detection of Aging Effects:
☐ Consistent with GALL Report ☐ Exception ☐ Enhancement ☐ Difference Identified
Discussion:

5. Monitoring and Trending:
☐ Consistent with GALL Report ☐ Exception ☐ Enhancement ☐ Difference Identified
Discussion:

6. Acceptance Criteria:
☐ Consistent with GALL Report ☐ Exception ☐ Enhancement ☐ Difference Identified
Discussion:

7. Corrective Action:

8. Confirmation Process:

9. Administrative Controls:

10. Operating Experience:

B. FSAR supplement review: (Include any commitments.)

C. Remarks and questions:

D. References/documents used: (Include number designation, full title, revision number, date, and page numbers, and ADAMS accession number.)

E. Applicant contact:

Project team member: _____ **Date:** _____

APPENDIX G

PLANT-SPECIFIC AMP AUDIT/REVIEW WORKSHEET

The worksheet provided in this appendix provides, as an aid for the reviewer, a process for documenting the basis for the assessments concerning individual program elements and sub-elements contained in Branch Technical Position RLSB-1 "Aging Management Review - Generic," in Appendix A to the SRP-LR. The worksheet provides a systematic method to record the basis for assessments or identifying when the applicant needs to provide additional information. Information recorded in these worksheets will be used when preparing the safety evaluation report input.

Plant-Specific AMP Audit/Review Worksheet

AMP Title: _____

Appendix Subsection: _____

A. Element Review and Audit

1. Scope of Program:
___ Consistent with SRP-LR ____ Exception ____ Difference Identified

Discussion:

SRP Criteria	LRA AMP	Comment*

2. Preventive Action:
___ Consistent with SRP-LR ____ Exception ____ Difference Identified

Discussion:

SRP Criteria	LRA AMP	Comment*

3. Parameters Monitored/Inspected:
___ Consistent with SRP-LR ____ Exception ____ Difference Identified

Discussion:

SRP Criteria	LRA AMP	Comment*

4. Detection of Aging Effects
___ Consistent with SRP-LR ____ Exception ____ Difference Identified

Discussion:

SRP Criteria	LRA AMP	Comment*

5. Monitoring and Trending

___ Consistent with SRP-LR ____ Exception ____ Difference Identified

Discussion:

SRP Criteria	LRA AMP	Comment*

6. Acceptance Criteria

___ Consistent with SRP-LR ____ Exception ____ Difference Identified

Discussion:

SRP Criteria	LRA AMP	Comment*

7. Corrective Action:

8. Confirmation Process:

9. Administrative Controls:

10. Operating Experience:

___ Consistent with SRP-LR ____ Exception ____ Difference Identified

Discussion:

SRP Criteria	LRA AMP	Comment*

* Consistent or technical basis for acceptance exception or difference

B. FSAR supplement review: (Include any commitments.)

C. Remarks and questions:

D. References/Documents used: (Include number designation, full title, revision number, date, page numbers, and ADAMS accession number.)

E. Applicant Contact:

Project team member:_____ **Date:** _____

Appendix H

AMR Comparison Worksheets

IP2 and IP3 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 applicant here):

Number	**Question for applicant (draft per RAI guidance)**	**Response (with date)**

References/Documents Used:

1.
2.
3.
4.

.

IP2 and IP3 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 or for which a precedent was cited (except for those assigned to DE or DCI) 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 Insert)

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.

Note: All Appendix H information can be documented in the AMR Excel spreadsheet; no need to create a separate worksheet.

APPENDIX I

ACRONYMS, ABBREVIATIONS, AND INITIALISMS

ADAMS	Agencywide Documents Access and Management System
AMP	aging management program
AMR	aging management review
ASME	American Society of Mechanical Engineers
CLB	current licensing basis
DE	Division of Engineering
DLR	Division of License Renewal
FSAR	Final Safety Analysis Report
GALL	Generic Aging Lessons Learned
ISG-LR	Interim Staff Guidance for License Renewal
IP2	Indian Point Nuclear Generating Unit No. 2
IP3	Indian Point Nuclear Generating Unit No. 3
LRA	license renewal application
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
RAI	request for additional information
RLRC	License Renewal Branch C
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

TLAA	Time Limited Aging Analysis
UFSAR	Updated Final Safety Analysis Report