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Industry Guideline for Implementing the Requirements of 10 CFR Part 54 for Subsequent License Renewal

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NOTICE

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ACRONYMS

ADAMS	Agencywide Documents Access and Management System
AERM	Aging Effect Requiring Management
AMP	Aging Management Program
AMR	Aging Management Review
BTP	Branch Technical Position
CLB	Current Licensing Basis
EOP	Emergency Operating Procedure
EQ	Environmental Qualification
ER	Environmental Report
FAC	Flow-Accelerated Corrosion
FP	Fire Protection
FSAR	Final Safety Analysis Report
GALL-SLR	Generic Aging Lessons Learned- Subsequent License Renewal
GSI	Generic Safety Issue
HELB	High Energy Line Break
I&C	Instrumentation and Controls
IEEE	Institute of Electronic and Electrical Engineers
IPA	Integrated Plant Assessment
IPEEE	Individual Plant Examination of External Events
ISG	Interim Staff Guidance
LRA	License Renewal Application
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
NSR	Non-Safety-Related
OE	Operating Experience
OMB	Office of Management and Budget
PEO	Period of Extended Operation
PRA	Probabilistic Risk Assessment
RAI	Request for Additional Information
SAMG	Severe Accident Management Guidelines
SC	Structure or Component
SER	Safety Evaluation Report
SLR	Subsequent License Renewal
SLRA	Subsequent License Renewal Application
SOC	Statements of Consideration
SPEO	Subsequent Period of Extended Operation
SQUG	Seismic Qualification Utility Group
SR	Safety-Related
SRP-SLR	Standard Review Plan – Subsequent License Renewal
SSC	Systems, Structures, and Components
TLAA	Time-Limited Aging Analysis
UFSAR	Updated Safety Analysis Report
USI	Unresolved Safety Issue
WSLR	Within Scope of License Renewal

INDUSTRY GUIDELINE FOR IMPLEMENTING THE REQUIREMENTS OF 10 CFR PART 54 FOR SUBSEQUENT LICENSE RENEWAL

1 INTRODUCTION

This guideline provides an acceptable approach for implementing the requirements of 10 CFR Part 54, the License Renewal Rule, hereinafter referred to as the Rule, for Subsequent License Renewal (SLR). The process outlined in this guideline is founded on industry experience in implementing the Rule for initial license renewal and on the lessons learned from that industry experience that can be applied to SLR. It is expected that following this guideline will offer a stable and efficient process, resulting in the issuance of a renewed license. However, applicants may elect to use other suitable methods or approaches for satisfying the Rule's requirements and completing a Subsequent License Renewal Application (SLRA).

This guideline uses terminology specific to the Rule. A copy of 10 CFR Part 54 is accessible from the NRC's LR webpage and should be reviewed.

1.1 BACKGROUND

In December 1991, the Nuclear Regulatory Commission (NRC) published 10 CFR Part 54 to establish the procedures, criteria and standards governing nuclear plant license renewal. Since publishing the original Rule, the NRC and the industry conducted various activities related to its implementation. In September 1994, the NRC proposed an amendment to the Rule. The final amendment was published in May 1995. It focuses on the effects of aging on long-lived, passive structures and components and time-limited aging analyses (TLAAs) as defined in 10 CFR 54.21(a)(1) and 54.3, respectively. In addition, the amendment allows greater reliance on the current licensing basis (CLB), the Maintenance Rule (10 CFR 65), and existing plant programs.

The standards for NRC to issue a renewed license are provided in § 54.29, which states:

> A renewed license may be issued by the Commission up to the full term authorized by § 54.31 if the Commission finds that:
>
> (a) Actions have been identified and have been or will be taken with respect to the matters identified in Paragraphs (a)(1) and (a)(2) of this section, such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB, and that any changes made to the plant's CLB in order to comply with this paragraph are in accord with the Act and the Commission's regulations. These matters are:
>
> (1) managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified to require review under § 54.21(a)(1); and
>
> (2) time-limited aging analyses that have been identified to require review under § 54.21(c).

(b) Any applicable requirements of Subpart A of 10 CFR Part 51 have been satisfied.

(c) Any matters raised under § 2.335 have been addressed.

As of the date of this publication, there are only 6 operating units that have not applied for their initial renewed operating licenses. Additionally, 46 units have entered their initial periods of extended operation (PEOs). In 2009, the very first plants that entered their initial PEOs became eligible, per 10 CFR 54, to apply for their second renewed licenses. Not long before this, in 2008, NEI, NRC, DOE, and EPRI hosted the very first workshop for the nuclear industry to begin to examine operation beyond the initial PEOs, or beyond 60 years of operation.

Since that time, all stakeholders within the industry have worked together to determine what was needed to prepare for the first SLRA submittal and its NRC review. This included significant efforts by NEI, NRC, DOE, EPRI, and nuclear utilities to determine what materials and technical issue research was needed to support operation beyond initial PEOs. Additionally, over that time frame, the NRC staff began the effort to initiate research and acquire data for the publication of SLR guidance that would replace the NRC guidance documents that had been published for initial LR (NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants;" NUREG-1801, "Generic Aging Lessons Learned (GALL) Report;" NUREG-1850, "Frequently Asked Questions on License Renewal of Nuclear Power Reactors;" NUREG-1950, "Disposition of Public Comments and Technical Bases for Changes in the License Renewal Guidance Documents NUREG-1800 and NUREG-1801;" and Regulatory Guide 1.188, "Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses". As part of that effort, they also examined ways in which the agency infrastructure might need to be changed to support the reviews of SLRAs. As a result of those activities, on January 31st, 2014, SECY-14-0016, "Ongoing Staff Activities to Assess Regulatory Considerations for Power Reactor Subsequent License Renewal," was submitted to the Commission. It contained recommendations and options for making changes to the NRC's LRA review process that would be used specifically for SLRAs. One of those recommendations included rulemaking for 10 CFR 54 specific to SLR.

The Commission responded on August 29th, 2014 with memorandum "Staff Requirements – SECY-14-0016 – Ongoing Staff Activities to Assess Regulatory Considerations for Power Reactor Subsequent License Renewal." In that memorandum, the Commission did not approve the staff's recommendation for rulemaking for power reactor SLR and identified specific requirements for the NRC staff to facilitate SLRA reviews. Since then, the industry stakeholders have worked to incorporate the Commissions requirements and develop the infrastructure and processes necessary for the generation of SLRAs and their NRC reviews as they are submitted.

To support this effort, prior to this document being published, nuclear utilities, through NEI, working with the other SLR stakeholders, including INPO, also published NEI 14-12, "Aging Management Program Effectiveness," NEI 14-13, "Use of Industry Operating Experience for Age-Related Degradation and Aging Management Programs," and the "Second License Renewal Roadmap." This document is an update to NEI 95-10, Rev. 6, "Industry Guidelines for Implementing the Requirements of 10 CFR 54". It provides the appropriate NEI 95-10 equivalent guidelines for the generation of nuclear plant SLRAs having the content needed by the NRC, including the Advisory Committee on Reactor Safeguards (ACRS), on which to base the recommendation to the Commission for the issuance of subsequent renewed licenses.

This document does not include all of the appendices that are included in NEI 95-10, Revision 6 because these would be the same in NEI 17-01 for use in preparing a SLRA as they are in NEI 95-10 Rev. 6. The following appendices to NEI 95-10 Rev. 6 apply to preparation of a SLRA.

- Appendix A, 10 CFR Part 54, the License Renewal Rule
- Appendix B, Typical Structure, Component and Commodity Groupings and Active/Passive Determinations for the Integrated Plant Assessment
- Appendix C, References (Note that the first 15 references listed in Appendix A of NEI 17-01 are included in their entirety in NEI 95-10, Rev. 6)
- Appendix D, Standard License Renewal Application Format (note that Appendix B in NEI 17-01 provides the basic outline of the format of a SLRA, but Appendix B of NEI 95-10, Rev. 6 provides more detail)
- Appendix F, Industry Guidance on Revised 54.4(a)(2) Scoping Criterion (Non-Safety Affecting Safety)

1.2 PURPOSE AND SCOPE

The major elements of the guideline (with their respective guideline sections) include:

- Identifying the systems, structures and components within the scope of license renewal (WSLR) (Section 3.1);
- Identifying the intended functions of systems, structures and components (SSCs) WSLR (Section 3.2);
- Identifying the structures and components (SCs) subject to aging management review (AMR) and intended functions (Section 4.1);
- Assuring that effects of aging are managed (Section 4.2);
- Application of new programs and inspections for SLR (Section 4.3);
- Identifying and resolving TLAAs (Section 5.1);
- Identifying and evaluating exemptions based on TLAAs (Section 5.2); and
- Identifying a standard format and content for a SLRA (Section 6.0).

Applicants interested in SLR are responsible for preparing a plant-specific SLRA which includes general information and technical information. The general information is much the same as that provided with the initial LRA. The technical information includes an Integrated Plant Assessment (IPA), the CLB changes during the NRC review of the application, TLAAs, a supplement to the Updated Final Safety Analysis Report (UFSAR), any technical specification changes or additions necessary to manage the effects of aging during the subsequent period of extended operation (SPEO), and a supplement to the plant's environmental report (ER) that complies with the requirements of Subpart A of 10 CFR Part 51, accessible from the NRC's LR webpage.

1.3 APPLICABILITY

This document is applicable to any operating license for nuclear power plants licensed pursuant to Sections 103 or 104b of the Atomic Energy Act of 1954, as amended (68 Stat. 919), and Title II of the Energy Reorganization Act of 1974 (88 Stat. 1242).

1.4 UTILIZATION OF NUREG-2191, NUREG-2192, REGULATORY GUIDE AND NRC ISGS

Applicants should consider three regulatory guidance documents: NUREG-2191, "Generic Aging Lessons Learned for Subsequent License Renewal (GALL-SLR) Report," NUREG-2192, "Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants," and NRC Regulatory Guide (RG) titled, "Standard Format and Content for Subsequent License Renewal Applications for Nuclear Power Plants." These documents have replaced, and are equivalent to, initial LRA guidance documents NUREG-1801, NUREG-1800, and Regulatory Guide 1.188, respectively.

NUREG-2191 contains a set of aging management review (AMR) tables for plant systems that are commonly within the scope of license renewal. The tables include AMR items for passive, long-lived structures or components (SCs) that are commonly within the scope of a SLRA and subject to an AMR. The AMR items identify the potential aging effects that may be applicable to the materials and environmental conditions for the SCs listed in the line items, as well as specific aging management programs or time-limited aging analyses (TLAAs) that may be used to demonstrate that the SCs will continue to perform their intended functions during the SPEO. The AMR items also identify whether further evaluation of the programmatic criteria in the listed aging management programs (AMPs) or evaluation criteria in the listed TLAAs need to be performed in order to manage the aging effects specified in the AMR items.

NUREG-2191 also documents the NRC staff's evaluation of generic aging management programs (AMPs) found to be adequate to manage the effects of aging during the SPEO. These include programs commonly credited for managing aging effects associated with TLAAs that are dispositioned in accordance with the TLAA acceptance criterion in 10 CFR 54.21(c)(1)(iii). The report also includes evaluations of mechanical programs, structural programs and electrical programs. NUREG-2191 programs are one acceptable way to manage aging effects. An applicant may credit other programs for aging management. NUREG-2191 has appendices that discuss quality assurance and operating experience for AMPs. Table X-01, "FSAR Supplement Summaries for NUREG-2191 Chapter X Aging Management Programs That May Be Used to Demonstrate Acceptability of Time-Limited Aging Analyses in Accordance with 10 CFR 54.21(c)(1)(iii)," and Table XI-01, "FSAR Supplement Summaries for GALL-SLR Report Chapter XI Aging Management Programs," contain recommended FSAR supplement summaries for the AMPs.

NUREG-2192 is a companion document to NUREG-2191, to provide guidance to NRC staff in reviewing an SLRA. Its principal purpose is to ensure the quality and uniformity of staff reviews of applications. It contains a chapter corresponding to each of the sections of an application: administrative information, scoping and screening methodology for identifying SCs subject to AMR and implementation results, aging management evaluation for in-scope SSC's (including AMR results and identification of AMPs), and TLAAs. An appendix contains three branch technical positions (BTPs) and a guideline for addressing operating experience (OE) in AMPs. BTP RLSB-1 addresses the aging management demonstration required by 10 CFR 54.21(a)(3). BTP IQMB-1 describes an acceptable process for implementing the corrective actions, the confirmation process and the administrative controls elements of AMPs for SLR. BTP RLSB-2 addresses aging effects or TLAAs related to unresolved safety issues (USIs) or generic safety issues (GSIs). Appendix A.4, Operating Experience for Aging Management Programs, provides

guidance on the incorporation of OE in AMPs and maintaining AMP effectiveness through the use of OE.

NRC's Regulatory Guide (RG) 1.188, Revision 1, provides a summary of application contents and formatting specifications for an LRA; it is expected that the NRC will issue similar guidance for an SLRA.

Changes and clarifications to the above guidance documents suggested by license renewal stakeholders and approved by the staff can be communicated via license renewal interim staff guidance (LR-ISG) documents. The process is described in NRC document "License Renewal Interim Staff Guidance Process," Revision 2. Details about each of the LR-ISGs are available on the NRC License Renewal Guidance Documents web page. Subsequent license renewal interim staff guidance (SLR-ISGs) documents that may be issued later and have not been incorporated into subsequent license renewal guidance documents should be considered by applicants.

Generally, SLR-ISGs will discuss technical issues rather than process issues.

It is important for applicants to note that the SLR-ISG positions for SLR may require considerations that differ from the applicant plant's CLB. Applicants may want to ensure their SLRAs are clear with respect to their CLB and note that some SLRA content is based on an SLR-ISG rather than the plant's CLB.

1.5 RESOLUTION OF CURRENT SAFETY ISSUES (E.G., GSIS AND USIS)

NUREG-0933, "Resolution of Generic Safety Issues," describes GSIs and USIs that should be reviewed to determine if any involve aging effects for SCs subject to AMR or TLAAs. Any aging effects that are identified should be specifically addressed in the SLRA. Prior to SLRA Safety Evaluation Report (SER) completion, any new issues contained in later versions of NUREG-0933 must be reviewed and addressed if determined to be applicable to the applicant's plant and they involve aging effects for SCs subject to AMR or they are associated with a TLAA. The results may be submitted to the NRC in the annual update.

For a GSI or USI affecting an AMR or TLAA evaluation, there are several approaches that can be used to satisfy the finding required by §54.29, as stated previously:

- If resolution has been achieved before issuance of a renewed license, implementation of that resolution could be incorporated within the SLRA. The plant-specific implementation information should be provided.
- An applicant may choose to submit a technical rationale that demonstrates that the CLB will be maintained until some later time in the SPEO, at which time one or more options (e.g., replacement, analytical evaluation, or a surveillance/maintenance program) would be available to adequately manage the effects of aging. The SLRA would have to describe the basis for concluding that the CLB is maintained in the SPEO. The SLRA would also have to describe options that are technically feasible during the SPEO to manage the effects of aging in sufficient detail that the NRC can conclude that there is reasonable assurance that the aging effect will be managed to maintain the CLB during the SPEO for each of the options. The applicant would not have to pre-select which option would be used.

- Another approach could be for an applicant to develop an AMP that, for that plant, incorporates a resolution to the aging effects issue.
- Another option could be to propose to amend the CLB (as a separate action outside the SLRA), which, if approved, would remove the intended function(s) from the CLB.

During the preparation and review of a SLRA, an applicant, or the NRC, may become aware of an aging management or TLAA issue that may be generically applicable (but is not yet part of the formal GSI resolution process). An applicant must still address the issue in its SLRA to demonstrate that the effects of aging are or will be adequately managed or that TLAAs have been evaluated for the SPEO.

See NUREG-2192, Appendix A.3, BTP RLSB-2 for more information on this matter.

1.6 ORGANIZATION OF THE GUIDELINE

Obtaining a renewed operating license requires a three-phase approach. The first phase is the technical work that must be performed to generate the information that is included in the SLRA. The second phase is the preparation of the SLRA. Phase three is submitting the SLRA and the post-submittal activities required up until issuance of the renewed operating license by the Commission.

The technical work includes determining the SSCs WSLR, identifying the SCs subject to AMR, identifying aging effects requiring management (AERMs), evaluating plant programs, and reviewing TLAAs and exemptions and justifying their applicability for license renewal. The technical phase produces results or information that is ultimately incorporated into the SLRA, so it is important to maintain accurate and detailed supporting documentation. This supporting documentation is not required to be submitted as part of the application; however, it must be auditable and retrievable for NRC review. The SLRA must contain sufficient information for the NRC staff to accept and docket the application, as described in NUREG-2192, Section 1.1.3.1 to provide reasonable assurance that the staff can complete its review within the specified schedule. Applicants should also review recent license renewal industry experience and address relevant issues (e.g., outcomes from significant NRC RAIs) in their SLRA. Sections 3, 4 and 5 of this document provide guidance on how to proceed through the technical phase. These sections explain what work needs to be done, how to do it, and the expected results.

Section 6 discusses the standard SLRA format. The standard format is further discussed in Appendix B. Appendix B also provides guidance on the technical content to be included in the SLRA, which will differ from the plant's original LRA.

Section 7 discusses the activities after submittal of the SLRA including annual updates, the review, and post-renewal process requirements.

Applicants are encouraged to review applications that have been submitted and the resulting SERs that are issued in the form of NUREGs and to have their applications reviewed by another utility or industry group.

2 OVERVIEW OF PART 54

The Rule contains the regulatory requirements that must be satisfied to obtain a renewed operating license, which allows continued operation of a nuclear power plant beyond its previous license term. (Figure 2.0-1 reflects the license renewal implementation process.)

The Rule is founded on two principles. The first principle of license renewal is that with the possible exception of the detrimental effects of aging on the functionality of certain plant SSCs in the SPEO and possibly a few other issues related to safety only during the SPEO, the regulatory process is adequate to ensure that the licensing bases of all currently operating plants provide and maintain an acceptable level of safety so that operation will not be inimical to public health and safety or common defense and security. The second and equally important principle of license renewal holds that the plant-specific licensing basis must be maintained during the renewal term in the same manner and to the same extent as during the original licensing term. This principal would be accomplished, in part, through a program of age-related degradation management for systems, structures, and components that are important (i.e., in-scope) to license renewal.

In addition to the identification and evaluation of TLAAs, the focus of the Rule is on providing reasonable assurance that the effects of aging on the functionality of long-lived, passive SCs are adequately managed in accordance with the plant-specific CLB design basis conditions such that the intended functions are maintained in the SPEO. This demonstration is documented in the SLRA.

As specified in § 54.19 through § 54.21, the SLRA contains general information, technical information, technical specification changes, and environmental information.

The general information concerns the plant site and the plant owner(s). The required information is specified in 10 CFR 50.33(a) through (e), (h) and (i). Additionally, the application must include conforming changes to the standard indemnity agreement, 10 CFR 140.92, Appendix B, to account for the expiration term of the proposed renewed license.

The technical information includes, but is not limited to: (1) the integrated plant assessment (IPA), which is the demonstration that the effects of aging on in-scope long-lived, passive SCs are being adequately managed such that the intended functions are maintained, consistent with the CLB, in the renewal period; (2) the listing and evaluation of TLAAs and any exemptions in effect that are based on TLAAs; and (3) a supplement to the plant's UFSAR that contains a summary description of the programs and activities that are cited as managing the effects of aging and the evaluation of TLAAs. See Table 6.2-2 and Appendix B for additional information on SLRA content.

The application also must include any changes or additions to the plant's technical specifications that are necessary to manage the effects of aging during the SPEO. Last, the application must contain a supplement to the plant's ER that complies with the requirements of 10 CFR Part 51.

Once the SLRA is submitted to the NRC, it must be amended each year in accordance with §54.21(b) to identify any changes to the CLB that materially affect the contents of the application, including the UFSAR supplement.

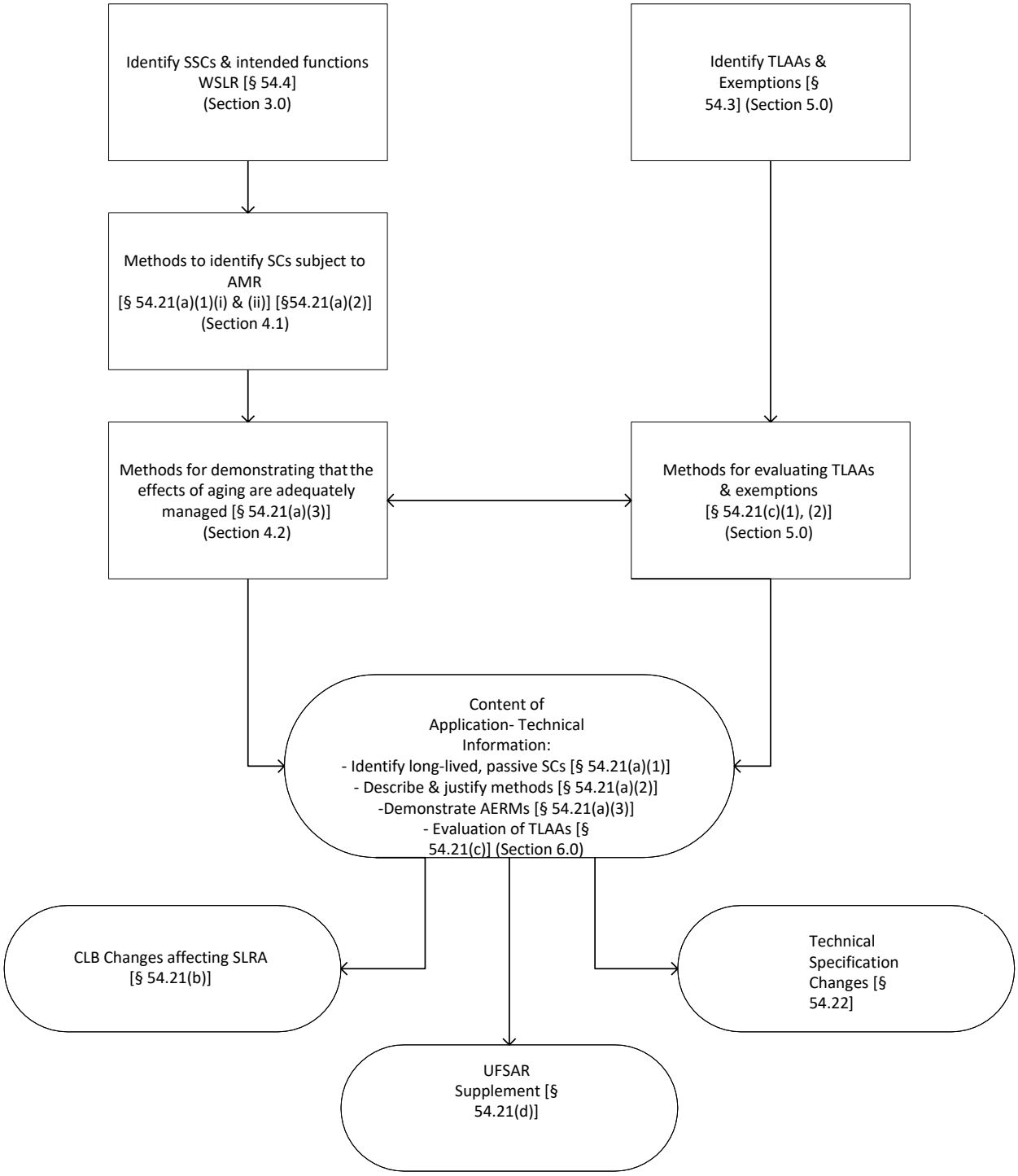
Information and documentation required by, or otherwise necessary to document compliance with, the Rule must be maintained by the applicant in an auditable and retrievable form for the term of the renewed operating license in accordance with § 54.37(a). Additionally, in accordance with § 54.37(b), after the renewed license is issued, the UFSAR update required by 10 CFR 50.71(e) must include any SSCs newly identified that would have been subject to AMR or evaluated as a TLAA in accordance with §54.21.

The Rule, at 10 CFR 54.30, specifies matters that are not subject to NRC review and that may not be contested in a hearing for license renewal. The intent of the provision in 10 CFR 54.30 is to clarify that safety matters of noncompliance for the current operating term should not be the subject of the SLRA or the subject of a hearing in a renewal proceeding, absent specific NRC direction. Issues concerning operation during the currently authorized term of operation should be addressed as part of the current license in accordance with the Commission's current regulatory process rather than deferred until a renewal review (which will not occur if the licensee chooses not to renew its operating license). Furthermore, 10 CFR 54.30 is intended to make clear that aging issues discovered during the renewal review for the SCs that are reviewed in 10 CFR 54.21(a)(3) or §54.21 (c)(1) and that raise questions about the capability of these SCs to perform their intended function during the current term of operation must be addressed under the current license. However, an applicant for renewal is not relieved from addressing the issue relevant to the SPEO as part of its SLRA.

Section 54.30 does not require a general demonstration of compliance with the CLB as a prerequisite for issuing a renewed license. Section 54.30 discusses the applicant's responsibilities for addressing safety matters under its current license, which are not within the scope of the renewal review.

Since this is a guidance document for SLR, its users will have already implemented Part 54 for the applicable plant's initial LRA submittal and PEO entry. Because of the requirement under §54.37(a) for the maintenance of auditable and retrievable documentation from that project, all of that documentation is available in the plant's record storage system. Even for the plants that submitted LRAs prior to the issuance of NUREGs 1800, 1801, and Regulatory Guide 1.188, much of what was done for initial LR scoping, the IPA, and the determination of the TLAAs is still applicable for SLR. Complying with the requirements of §54.37(b) have served to keep that initial LR scope up to date due to the efforts required to analyze plant changes and report "newly identified" components to the NRC essentially for each refueling cycle. Some licensees, as part of that effort, will have also identified and documented the plant components that were found to have been added to the plant since initial LRA submittal. The coupling of both of those sets of information and the re-use of the IPA and TLAA documentation that provided the basis for the initial LRA submittal provide a significant starting point for SLR.

Figure 2.0-1: SLR Implementation Process



3 IDENTIFY THE SSCS WSLR AND THEIR INTENDED FUNCTIONS

This section provides a process for determining which of the many SSCs that make up a commercial nuclear power plant are included WSLR. The scoping process described in this guideline is at the system and structure level for the majority of the SSCs. This is not intended to imply that scoping at a component level is not allowed by the Rule. In fact, for some plants it may be easier to scope at the component level. In addition, it may be convenient for a plant to scope using more than one method. For instance, a system-based scoping approach may be used for mechanical systems and a component or commodity-based scoping approach used for electrical systems (Figure 3.0-1 is a process diagram for this section).

To assist the applicant in determining the SSCs WSLR, a list of potential information sources is provided as Table 3.1-1. The table is not intended to be all encompassing nor is it intended to be a list of "must review" sources.

Table 3.1-1 includes potential sources that contain information that is beyond the plant's licensing basis. These include probabilistic risk assessment (PRA) and individual plant examinations of external events (IPEEEs). Table 3.1-1 also includes potential information sources that contain information that is beyond the plant's design basis. These include emergency operating procedures (EOPs) and Severe Accident Management Guidelines (SAMGs). If the applicant chooses to use these four sources, or other sources that are beyond the plant's licensing or design bases, the provisions of § 54.4 prevail when determining the systems and components that are in the scope of license renewal.

NUREG-2192 Section 2.1.3 and NUREG-2192 Table 2.1-1 list the documents an NRC reviewer is expected to consider. NUREG-2192 Section 2.1.3.1 describes some general expectations of scoping. NUREG-2192 Sections 2.2.1 and 2.2.3.1, and NUREG-2192 Table 2.2-1 provide examples an NRC reviewer may consider in reviewing scoping results.

3.1 SSCs WSLR

Part 54 Reference

§54.4

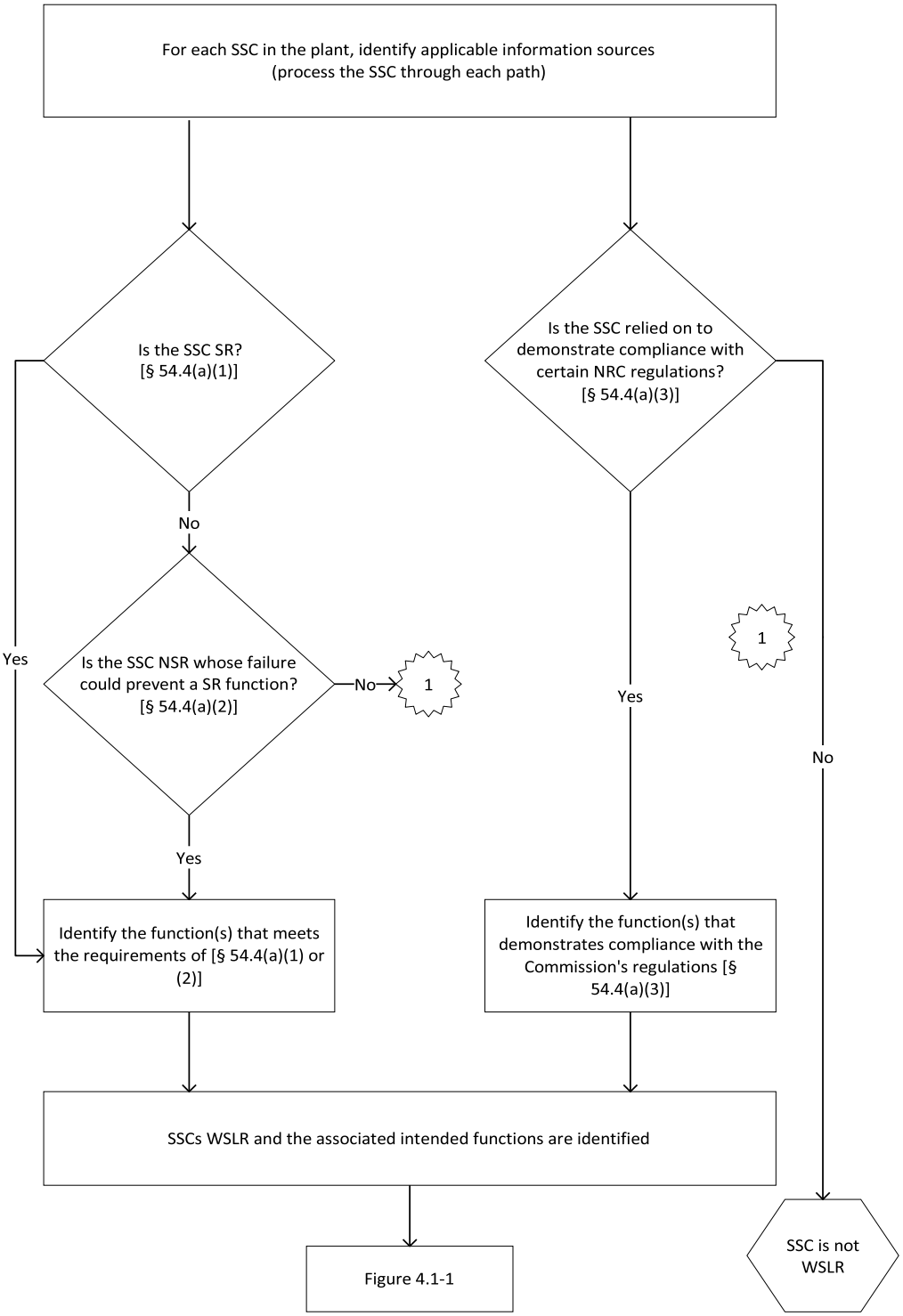
(a) Plant systems, structures, and components within the scope of this part are –

(1) Safety-related systems, structures, and components which are those relied upon to remain functional during and following design-basis events (as defined as in 10 CFR 50.49 (b)(1)) to ensure the following functions:
(i) The integrity of the reactor coolant pressure boundary;
(ii) The capability to shut down the reactor and maintain it in a safe shutdown condition; or
(iii) The capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposure comparable to the guidelines in § 50.34(a)(1), 50.67(b)(2), or § 100.11 of this chapter, as applicable.

(2) All non-safety-related systems, structures, and components whose failure could prevent satisfactory accomplishment of any of the functions identified in paragraphs (a)(1)(i), (ii), or (iii) of this section.

(3) All systems, structures, and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), pressurized thermal shock (10CFR 50.61), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

Figure 3.0-1: A Method to Identify SSCs and Intended Functions WSLR [§ 54.4(a) & (b)]



3.1.1 Safety-Related SSCs

There are a number of viable alternatives for identifying safety-related (SR) SSCs. Table 3.1-1 is a listing of information sources for consideration in this process. There may be information sources available to applicants that are not identified in Table 3.1-1. These sources may be considered as well.

Regardless of the approach used, a SR SSC is WSLR if it is relied upon to remain functional during and following design basis events as defined in §50.49(b)(1) to ensure the following functions:

- The integrity of the reactor coolant pressure boundary;
- The capability to shut down the reactor and maintain it in a safe shutdown condition; or
- The capability to prevent or mitigate the consequences of accidents that could result in potential off-site exposure comparable to the guidelines in §50.34(a)(1), §50.67(b)(2), or §100.11 of this chapter, as applicable.

It is conceivable that, because of plant unique considerations and preferences, applicants may have previously elected to designate some SSCs as SR that do not perform any of the requirements of §54.4(a)(1). Therefore, a SSC may not meet the requirements of §54.4(a)(1) although it is designated as SR for plant- specific reasons. However, the SSCs would still need to be evaluated for inclusion WSLR using the criteria in §54.4(a)(2) and §54.4(a)(3). For example, an applicant may have designated refueling equipment as SR even though it does not meet the criteria delineated above. In such cases, the applicant shall include a discussion of the process (in accordance with §54.21(a)(2)) for making these determinations.

Similarly, an applicant's current licensing basis (CLB) definition of SR may not match the §54.4(a)(1) definition. In these cases, the applicant should apply the §54.4(a)(1) definition for purposes of identifying the SSCs that are WSLR. This is consistent with NUREG-2192, Section 2.1.3.1.1.

Relative to the industry's post-Fukushima efforts, the modifications that have been made within the plant to facilitate new connections of the now required standby emergency portable power and emergency portable cooling water equipment may bring additional components installed associated with the new connections in the applicable interfacing systems into scope for license renewal. These added components are subject to AMRs but may screen out; however, the portable emergency equipment that is normally stored outside of the plant is not WSLR.

3.1.2 NSR SSCs Whose Failure Prevents SR SSCs from Fulfilling Their SR Function

An applicant should rely on the plant's CLB, actual plant-specific experience, industry-wide OE, as appropriate, and existing plant-specific engineering evaluations to determine the appropriate SSCs in this category. Consideration of hypothetical failures that could result from system interdependencies that are not part of the CLB and that have not been previously experienced is not required. Hypothetical failures that are part of the CLB may require consideration of second-, third-, or fourth-level support systems. NUREG-2192 Section 2.1.3.1.2 and Table 2.1-2 contain NRC expectations on non-safety-related (NSR) scoping. See

Appendix F of NEI 95-10, Rev. 6, for the industry guidance for §54.4(a)(2) scoping criterion. Also see NUREG-2192 Table 2.1-2 regarding hypothetical failures.

For the plants that had initial LRA submittals prior to the 2004/2005 time frame, this effort may not have been the same methodology and/or standards as that performed for later LRA submittals. For that reason, those plants may need to expend more effort for their §54.4(a)(2) scoping effort for SLR.

3.1.3 SSCs Relied on to Demonstrate Compliance with Certain Specific Commission Regulations

Systems, structures and components relied on to perform a function that demonstrates compliance with the following regulations are also in the scope of the Rule:

- Fire Protection (10 CFR 50.48)
- Environmental Qualification (10 CFR 50.49)[1]
- Pressurized Thermal Shock (10 CFR 50.61 or 10 CFR 50.61a, as consistent with the plant's CLB) – only applicable to PWRs
- Anticipated Transient Without Scram (10 CFR 50.62)
- Station Blackout (10 CFR 50.63)

The information sources in Table 3.1-1 could be considered for identifying the SSCs whose functions are relied on to demonstrate compliance with the regulatory requirements (i.e., whose functions were credited in the analysis or evaluation). Mere mention of a SSC in the analysis or evaluation does not constitute support of a specified regulatory function. An applicant should rely on the plant's CLB, plant-specific experience, industry-wide OE, as appropriate, and existing plant-specific engineering evaluations to determine the appropriate SSCs in this category. Consideration of hypothetical failures that could result from system interdependencies that are not part of the plant's CLB and that have not been previously experienced is not required. Hypothetical failures that are part of the CLB may require consideration of second-, third-, or fourth-level support systems. See NUREG-2192, Section 2.1.3.1.3 for NRC expectations on regulated events scoping. Also see NUREG-2192 Table 2.1-2 regarding cascading.

Relative to Fire Protection under 10 CFR 50.48, many plants have adopted NFPA-805, replacing Appendix R, since receipt of their initial renewed operating licenses. This very likely affects the plant equipment that is WSLR for SLR as compared to what was WSLR for initial LR. Some plant equipment may have been added to scope and some equipment may have been deleted.

[1] The Statements of Consideration (SOC) for the amendments to 10 CFR Part 54 [60FR22466] state that "...the Commission agrees that for purposes of §54.4, the scope of §50.49 equipment to be included within §54.4 is that equipment already identified by licensees under 10 CFR 50.49(b). Licensees may rely upon their listing of 10 CFR 50.49 equipment, as required by 10 CFR Part 50.49(d), for purposes of satisfying §54.4 with respect to equipment within the scope of §50.49."

After the NRC's approval for NFPA-805 implementation, these differences should have been identified by the plant's activities relative to its ongoing compliance with the requirements of §54.37(b).

Table 3.1-1: Sample Listing of Potential Information Sources

• Verified Databases (database that is subject to administrative controls to assure and maintain the integrity of the stored data or information)
• Master Equipment Lists (including NSSS Vendor Listings)
• Q-Lists
• UFSARs
• Piping and Instrument Diagrams
• Electrical One-Line or Schematic Drawings
• Operations and Training Handbooks
• Design Basis Documents
• General Arrangement or Structural Outline Drawings
• Quality Assurance Plan or Program
• Maintenance Rule Compliance Documentation
• Design Basis Event Evaluations
• Docketed Correspondence
• System Interaction Commitments
• Technical Specifications
• EQ Program Documents
• Regulatory Compliance Reports (Including SERs)
• PRA Summary Report
• EOPs
• SAMGs
• IPEEEs
• Initial LR project database(s)
• Initial LR project scoping/screening reports
• Initial LR project AMR reports
• Initial LR project TLAA evaluation report
• Initial LRA and applicable RAI responses and SER
• Vendor Topical Reports
• NRC Orders, exemptions, or license conditions for the facility

3.2 INTENDED FUNCTIONS OF SSCS WSLR

Part 54 Reference

§54.4

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(b) The intended functions that these systems, structures, and components must be shown to fulfill in §54.21 are those functions that are the bases for including them within the scope of license renewal as specified in paragraphs (a)(1)-(3) of this section.

The intended functions define the plant process, condition, or action that must be accomplished to perform or support[2] a safety function for responding to a design basis event or to perform or support a specific requirement of one of the five regulated events in §54.4(a)(3). At a system level, the intended functions may be thought of as the functions of the system that are the bases for including this system WSLR per §54.4(a)(1) – §54.4(a)(3). Where the plant's licensing basis includes requirements for redundancy, diversity, and defense- in-depth, the system intended functions include providing for the same redundancy, diversity, and defense-in-depth during the SPEO. For example, a system with two independent trains, according to the plant's CLB, has to perform the intended functions by each independent train.

As noted in the above reference, §54.4(b) provides criteria that should be used to identify the intended functions of SSCs within the scope of the Rule. Therefore, as part of the SLR process, an applicant should establish a method that identifies SSCs within the scope of the Rule and the intended functions that are the basis for their inclusion.

In identifying intended functions, it is important to understand that the terms “systems, structures, and components (SSCs)” and “structures and components (SCs)” are used differently throughout the Rule and statements of consideration (SOC). The SOC, in a footnote (60FR22462), clarifies why "SSCs" is used in some sections of the SOC and Rule versus "SCs ". The SOC clarifies that the scoping section (§54.4) includes SSCs rather than just SCs to allow an applicant flexibility in how it develops and implements a methodology to identify those SCs that are subject to an AMR for SLR. Also, §54.4 and the associated SOC sections include SSCs to allow the applicant flexibility on how exemptions containing TLAAs can be evaluated for the SPEO (§54.21 (c)(2)) because exemptions might have been granted for a particular system.

The IPA required by §54.21(a) is performed at the structure/component level. Guidance on the IPA process is provided in Section 4 of this guideline. The Rule contains flexibility to permit an applicant to start the IPA process at either the system/structure or structure/component level as long as the passive, long-lived SCs are identified. The intended functions of the SCs are the same regardless of the starting point. If the starting point is the system level, the system intended functions are identified as previously discussed. However, the intended functions of the SCs still have to be determined as discussed in Section 4.1. These functions are the specific functions of the SCs that support the system/structure intended function(s). Similarly, if the starting point is the structure/component level, the intended functions are those that included these SCs WSLR. A

[2] The term “support” here includes SSCs whose failure could prevent other SSCs from performing their intended function

SC may have multiple functions; but, only the function(s) meeting the criteria of §54.4 are to be identified for SLR. See NUREG-2192 Table 2.1-4 for examples. Intended functions need not be defined for component piece parts.

The process leading to the Maintenance Rule scoping determinations may also have produced a listing of the system and structure functions. Although it is not a requirement of the Maintenance Rule, such a listing may be based on a documented procedure that ensures a comprehensive and consistent approach to defining the functions for all the systems within the scope of the Maintenance Rule. If this is the case, then the Maintenance Rule documentation can be used to help identify the functions of SR systems and NSR (affecting SR) systems WSLR. The information sources used to identify the systems required for compliance with the regulations in §54.4(a)(3) should be used to identify their associated functions. If the Maintenance Rule documentation does not define the system functions, does not rely on a procedure that uses a structured approach, or the applicant elects not to use this source, then alternative documentation such as a verified database or a safety analysis report, operations training manuals, etc., can be used to identify the functions of SR systems and NSR (affecting SR) systems. A sample listing of information sources that can be used to identify the functions of all systems (and SCs) WSLR is provided in Table 3.1-1.

3.3 DOCUMENTING THE SCOPING PROCESS

Section 54.37(a) of the Rule requires applicants to retain in an auditable and retrievable form all information and documentation required by, or otherwise necessary to document compliance with, the provisions of the Rule.

The results of the scoping determination should be documented in a format consistent with other plant documentation practices. The information may be maintained in hard-copy or electronic format. If available and appropriate, the information may be incorporated into an existing plant database. The applicant should use the quality assurance program in effect at the plant when documenting the results of the scoping process. The information to be documented by the applicant should include:

A designation of the plant SSCs that are SR (§54.4 (a)(1)), meet the requirements of §54.4(a)(2), or meet the requirements of §54.4(a)(3);

Identification of the SSCs' functions that meet the requirements of §54.4(b) and, therefore, are intended functions; and

The information sources, used to accomplish the above, and any discussion needed to clarify their use.

Applicants have typically provided mechanical system drawings to NRC concurrent with the application. The drawings are generally not a part of the application and are submitted only to facilitate NRC staff review. The NRC staff reviews the scoping and screening in accordance with

Section 2.3 of NUREG-2192. To facilitate NRC staff review, the applicants should submit drawings showing the mechanical components that are WSLR in accordance with 10 CFR 54.4(a), and in addition, system functions that meet 10 CFR 54.4(a) should also be identified.

4 INTEGRATED PLANT ASSESSMENT (IPA)

The IPA is the core of the SLRA. It is the transition from the scoping process to the screening process where the focus is on SCs and their intended functions. Once the SSCs WSLR are identified, the next step is to determine which SCs are subject to AMR. Specifically,§54.21(a)(1) states that the AMR is required for the SCs that perform an intended function without moving parts or without a change in configuration or properties (i.e., it is passive) and that are not subject to replacement based on a qualified life or specified time period (i.e., it is long-lived). The IPA also includes a description and justification of the methods used to determine the passive, long-lived SCs and a demonstration that the effects of aging on those SCs will be adequately managed so that the intended function(s) will be maintained consistent with the plant-specific CLB for the SPEO.

Section 4.1 presents one method to identify SCs subject to AMR. There are two steps required to perform an AMR. First, aging effects that require management (AERMs) are identified and evaluated. Then AMPs are identified to manage the effects of aging such that the intended SC function can be maintained consistent with the CLB for the SPEO. Section 4.2 describes methods to identify AERMs. Evaluation of AMPs is presented in Section 4.3

4.1 IDENTIFICATION OF SCS SUBJECT TO AMR AND INTENDED FUNCTIONS

Part 54 Reference

§54.21(a)(1)(i) and (ii)

(1) For those systems, structures, and components within the scope of this part, as delineated in §54.4, identify and list those structures and components subject to an aging management review. Structures and components subject to an aging management review shall encompass those structures and components -

(i) That perform an intended function, as described in §54.4, without moving parts or without a change in configuration or properties. These structures and components include, but are not limited to, the reactor vessel, the reactor coolant system pressure boundary, steam generators, the pressurizer, piping, pump casings, valve bodies, the core shroud, component supports, pressure retaining boundaries, heat exchangers, ventilation ducts, the containment, the containment liner, electrical and mechanical penetrations, equipment hatches, seismic Category I structures, electrical cables and connections, cable trays, and electrical cabinets, excluding, but not limited to, pumps (except casing), valves (except body), motors, diesel generators, air compressors, snubbers, the control rod drive, ventilation dampers, pressure transmitters, pressure indicators, water level indicators, switchgears, cooling fans, transistors, batteries, breakers, relays, switches, power inverters, circuit boards, battery chargers, and power supplies; and

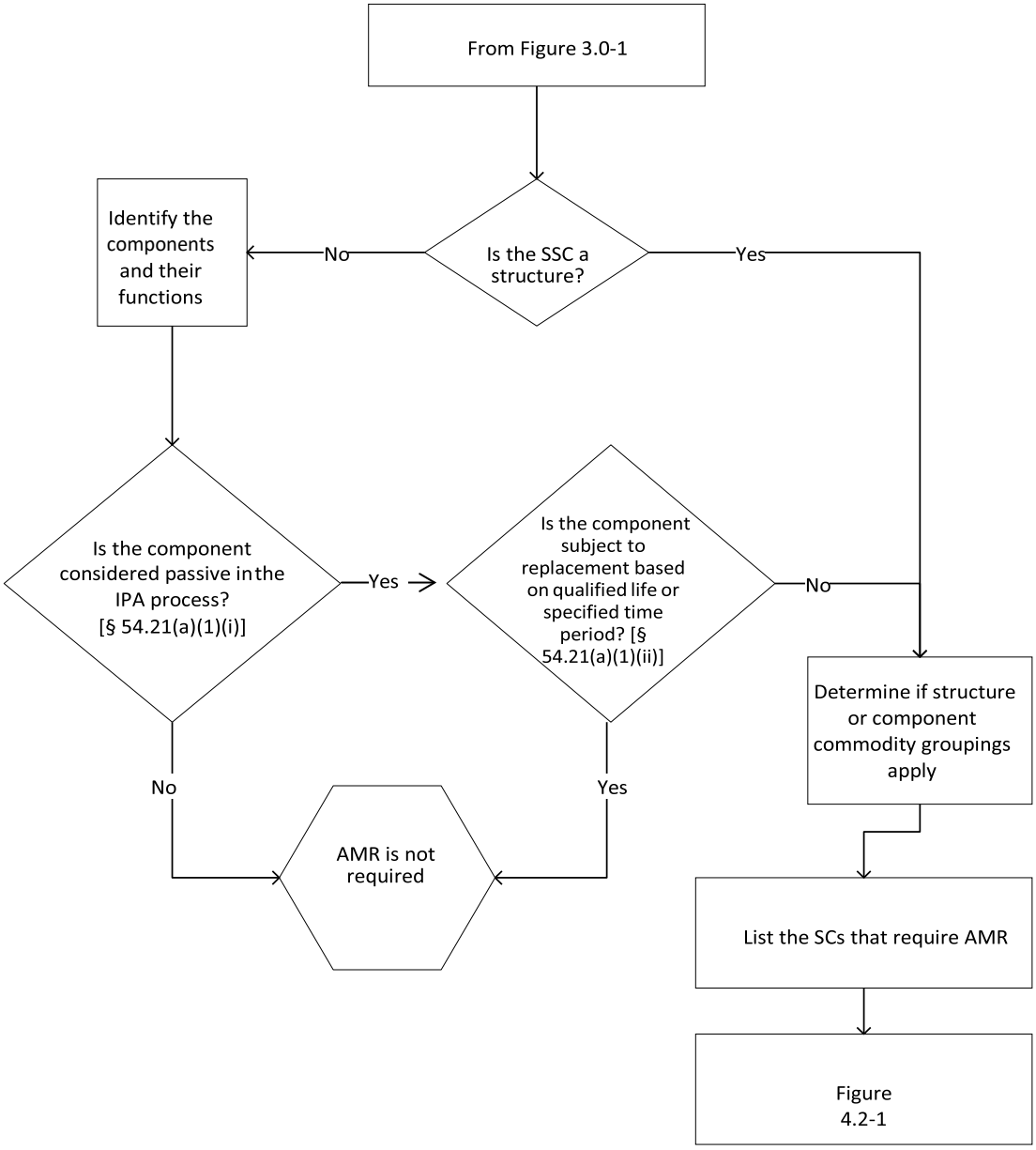
(ii) That are not subject to replacement based on a qualified life or specified time period.

§54.21(a)(2)

(2) Describe and justify the methods used in paragraph (a)(1) of this section.

The method that will accomplish the objective of identifying SCs subject to AMR must identify the SCs meeting the criteria of §54.21(a)(1)(i) and (ii). Figure 4.1-1 reflects the method described in this section

Figure 4.1-1: Identification of SCs Subject to AMR [§ 54.21(a)(1)]



Selection of an appropriate method is dependent on the applicant's information management system(s). For example, the availability of computer databases of plant equipment may result in a more efficient component-by-component review. Absent such databases, an applicant may use a manual review based on system piping and instrumentation drawings and electrical one-line diagrams supplemented by other plant documentation as required.

If an applicant chooses, the applicant can use a bounding approach and the list could be larger (e.g., all passive SCs). Such a bounding approach may be more efficient, especially when a program will cover all SCs in an area whether or not all the SCs in the area are subject to AMR.

All long-lived, passive SCs that perform or support an intended function without moving parts or a change in configuration or properties are subject to AMR. For all such SCs, the SC intended function is documented for use during the AMR of the IPA. The SC intended function is the specific function of the SC that supports the system intended function. Plant-specific CLBs require intended functions to be performed under a variety of design conditions. NUREG-2192 Table 2.1-4 is a listing of typical passive SC intended functions.

In making the determination that a SC's intended function is performed without moving parts or a change in configuration or properties, it is not necessary to consider the piece parts of the SC. However, in the case of valves and pumps, the valve bodies and pump casings may perform an intended function by maintaining the pressure-retaining boundary and, therefore, would be subject to AMR.

If the SC is not subject to replacement based on a qualified life or specified time period, then it is considered long-lived pursuant to §54.21(a)(1)(ii). Replacement programs may be based on vendor recommendations, plant experience, or any means that establishes a specific service life, qualified life, or replacement frequency under a controlled program. SCs that are not long-lived are not subject to AMR. SCs that are considered to not be long-lived because they are replaced based on qualified life or specified time period should be included in a controlled process that schedules the replacement of the components, such as a Preventive Maintenance Program. If SCs that are considered to not be long-lived in the SLRA are later removed from a replacement program, then the aging effects associated with these SC's must be managed and the requirements of 54.37(b) become applicable.

Use of Commodity Groups and Component Types

It may be beneficial to create commodity groups of like SCs, possibly including those that are active and passive, to disposition the entire group with a single AMR. The basis for group SCs can be such characteristics as similar design, similar materials of construction, similar aging management practices, and/or similar environments. If a commodity group of like SC's that is being considered is determined to include components with varying environments or operating conditions, the proposed commodity group should be divided into multiple commodity groups, each with similar environments and operating conditions. NUREG-2192 Table 2.1-6 provides a listing, although not all-inclusive, of typical plant components, structures, and commodity groups, along with a determination of whether the group is active or passive. Applicants are encouraged to use this table in determining SCs subject to an AMR.

As the format of license renewal applications has evolved, the use of the term "Commodity

Group" has evolved, and the term "Component Type" has been introduced into license renewal applications. "Component Type" is used to refer to mechanical and civil/structural components that are grouped together into one line in an AMR table within a system or structure that is identified in Chapter 2 of a SLRA. For example, all the valve bodies in a system that are made of the same material and are in the same internal and external environments are grouped together into one line. "Commodity Group" has been used to refer to electrical components that are grouped together across systems and are evaluated for the entire plant, not on a system by system basis. The "Commodity Group" approach could also be used for mechanical and civil/structural components if the same AMP could be used for all the components in the Commodity Group for the entire plant.

Structures Requiring AMR

Structures WSLR are long-lived and passive and require AMR. It may be useful, however, to categorize structures by type (e.g., poured concrete, block concrete, structural steel, shield walls, metal siding, foundation on piles, etc.) in preparation for the AMR. Subdividing complex structures into discrete elements (e.g., walls, floors, slabs, doors, penetrations, foundations, etc.) may be useful because some elements may not have intended functions as defined in the Rule and, therefore, are not subject to AMR. It may also be useful to individually identify spill containment, flood control, and fire barrier structural components where applicable and appropriate. A building, for example, with several rooms may be WSLR because one of its rooms performs an intended function. Only that one room needs to be identified as requiring AMR.

Structural Support Components

Structural supports either support or restrain mechanical and electrical equipment (e.g., hangers, pipe whip restraints, cable trays and supports). Structural supports can be considered part of or separate from the applicable structure. This guideline assumes that structural support commodity groups will be addressed separately from the applicable structure.

Also, there may be piping segments that provide structural support. For example, the SR/NSR boundary along a pipe run may occur at a valve location. The piping segment between this valve and the next seismic anchor provides structural support in a seismic event. This piping segment is WSLR.

Complex Assemblies

Some SCs, when combined, are considered a complex assembly (e.g., diesel generator starting air skids or heating, ventilating, and air conditioning refrigerant units). An applicant should establish the boundaries for such assemblies by identifying each SC that makes up the complex assembly and determining whether each one is subject to AMR. NUREG-2192 Table 2.1-2 provides an example for a control room chiller assembly of how the components that require AMR might be determined.

Consumables

Consumables also need to be considered in the process for determining the SCs subject to an AMR. Consumables, as used in this guideline, comprise the following four categories: (a) packing, gaskets, component seals, O-rings; (b) structural sealants; (c) oil, grease and component

filters; and (d) system filters, fire extinguishers, fire hoses and air packs. Table 4.1-1 and NUREG-2192 Table 2.1-3 provide methods to disposition these consumables. Disposition of consumables should be described in the methodology as noted in NUREG 2192 Table 2.1-3.

Table 4.1-1: Treatment of Consumables

Consumable	Disposition
Packing, Gaskets, Component Seals and O-rings	These would not necessarily be called out explicitly in the scoping and screening. Instead they would be implicitly addressed at the component level. The applicant will be able to exclude these utilizing a clear basis.
Structural Sealants	Structural sealants would not necessarily be called out explicitly in the scoping and screening. Instead they would be implicitly addressed at the component level. Structural sealants may perform functions without moving parts or change in configuration and they are not typically replaced. It is expected that the applicant's structural AMP will address aging management of these items on a plant specific basis.
Oil, Grease and Component Filters	For these commodities, the screening process would be expected to exclude these materials because they are short-lived.
System Filters, Fire Extinguishers, Fire Hoses and Air Packs	These may be excluded, on a plant-specific basis, from an AMR under 10 CFR 54.21(a)(1)(ii) in that they are periodically replaced. The SLRA should identify the standards that are relied on for replacement as part of the method description; for example, NFPA standards for fire protection equipment.

4.2 IDENTIFICATION OF AERMS

Part 54 Reference

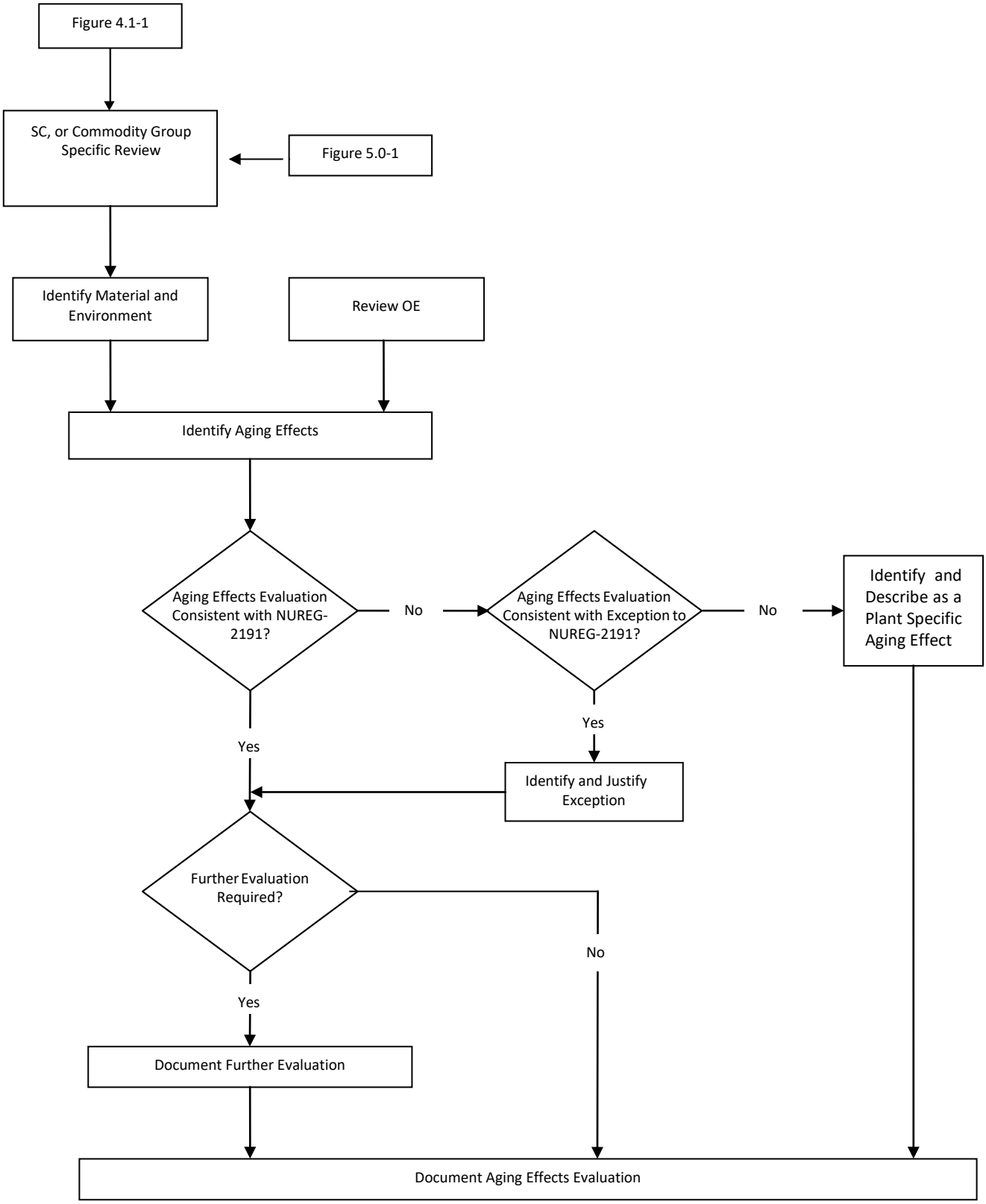
§54.21(a)(3)

(3) For each structure and component identified in paragraph (a)(1) of this section, demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation.

This section presents various techniques used to identify AERMs. However, other techniques may be acceptable provided that the demonstration method required by §54.21(a)(3) is accomplished. Figure 4.2-1 depicts the process to identify AERMs.

The demonstration required by §54.21(a)(3) is developed by first determining how the SC or commodity group performs its intended function(s). Next, the AERMs are identified. Finally, the applicable prospective plant AMPs are identified, and the ability to manage the aging effects is reviewed. The assembled information is then used to demonstrate either that the effects of aging will be managed by existing AMPs so that the SC intended function(s) will be maintained for the SPEO or that an additional, new AMP is necessary.

Figure 4.2-1: Identification of AERMs



4.2.1 TECHNIQUES TO IDENTIFY AGING EFFECTS

Assessing the appropriate level of review involves examining information from various investigations and developing a scope statement to describe the depth of review that is needed for the SC or commodity group. As appropriate, the assessment should include the following activities:

- Assemble information relative to the SC material properties and design margins. If the components are made from different materials or are subject to distinctly different aging effects, a separate review of each may be needed. Because minor differences in chemical content between different alloys may not significantly affect the way in which the materials age, in most cases detailed material specification may not be necessary to identify aging effects.

- Internal and external environments to which components subject to an AMR are exposed should be defined to identify environmental parameters or conditions that are applicable to the environment. A specific environment may be used to bound several environments based on consistency with the specific environmental parameters or conditions.

- Based on material and environment combinations, identify the aging effects potentially affecting the SCs' abilities to perform their intended functions. Various industry documents are available to provide guidance on identification of those aging effects.

- OE review is described in

Section 4.4. Material-Environment-

Stressor Approach
To determine AERMs, the applicant should consider and address the materials, environment, and stressors that are associated with each SC or commodity group under review. In many instances, the proper selection of materials for the operating environment results in few, if any, AERMs. For example, flow-accelerated corrosion (FAC) has very little or no aging effect on stainless steel piping. Conversely, carbon steel is subject to FAC in certain water environments. Several industry references identify aging effects based upon specific material-environment combinations. After identification of plant-specific environments and materials, the following industry references could be used as the primary means to identify and evaluate aging effects:

- Non-Class 1 Mechanical Implementation Guideline and Mechanical Tools, EPRI 1010639
- Aging Effects for Structures and Structural Components (Structural Tools), EPRI 1002950
- License Renewal Electrical Handbook, EPRI 1003057.

In addition to the consideration of materials, environment, and stressors, the applicant should consider and address the plant-specific CLB, plant and industry OE and existing engineering evaluations to identify the AERMs for the SC subject to an AMR. The AERMs are those that have been identified using the considerations described above, and that adversely affect the SC such that the intended function(s) may not be maintained consistent with the CLB for the SPEO.

Spaces Approach

The AMR can also be performed using a "spaces" approach. In the spaces approach, the plant is segregated into areas where common, bounding environmental parameters can be assigned. These areas can be of any size such as a specific area in a room, an entire room, a floor of a building or even all inside areas of an entire building. A bounding environmental parameter, such as temperature, would be the highest average temperature present around the subject components in the defined area.

When used to perform an AMR of a component or commodity group for a specific environmental stressor, the process would be as follows:

- Identify all component or commodity group materials of construction that have potential aging effects when exposed to the environmental stressor.
- Determine the value of the bounding environmental parameter to which the components in the area to be reviewed are exposed.
- Compare the aging characteristics of the identified materials to the bounding environmental threshold and determine if the components will be able to maintain their intended function through the SPEO.

Plant-Specific Evaluation of Aging Effects

An applicant may be able to evaluate the effects of aging for a specific combination of material and environment based on the plant's unique design and operating environment to determine that an aging effect will not occur or will not impact the SC's intended function under design basis conditions. The evaluation must include the plant specific OE to support the conclusion. The SLRA may have to include a commitment to an inspection to verify specific design values or that the aging effect is not occurring, is occurring as anticipated, or is not significant.

Use of References Reviewed by the NRC

Plant and generic industry references that provide an AMR of the same type of SC should be reviewed. A search of the public document room indices may identify such reports. References that have been reviewed and approved by the NRC provide an acceptable approach.

In the selected reference, identify the scope, assumptions and limitations affecting the results and conclusions of the analysis. Other characteristics that may need to be identified include the

configuration, functions, materials, service conditions, and original design parameters (corrosion allowance, loading cycles, etc.) and protective measures (coatings, cathodic protection, etc.) affecting the expected service life of the SC.

The identified characteristics of the SC in the selected reference should be compared to the plant-specific SC. The objective is to demonstrate that the plant characteristics are the same as, or are bounded by, the reference, and, therefore, it may be concluded that the selected report is applicable and may be used as a basis for the AMR of the plant SC. Any outlier conditions should be identified and reviewed to show that they are not significant with respect to the results or conclusions of the selected reference. Otherwise, a SC-specific AMR (guideline Section 4.2.1) of the outlier condition should be performed.

4.2.2 Consistency with NUREG-2191, Volume 1 Line Items

Each combination of component type, material, environment, and AERM should be compared with NUREG-2191 line items to identify consistencies. If there is no corresponding line item in NUREG- 2191, the combination is a plant-specific aging evaluation result.

Each applicant should identify how the aging evaluation results align with information in NUREG- 2191. This is accomplished through a series of notes identified in Table 4.2-1. All note references with letters are standard notes that will be the same from application to application throughout the industry. Any notes the plant requires that are in addition to the standard notes will be identified by a number and deemed plant-specific.

Table 4.2-1: NUREG-2191 Consistency Notes for AMR Results

Standard Notes

A. Consistent with NUREG-2191 item for component, material, environment, and aging effect. AMP is consistent with NUREG-2191 AMP.

B. Consistent with NUREG-2191 item for component, material, environment, and aging effect. AMP takes some exceptions to NUREG-2191 AMP.

C. Component is different, but consistent with NUREG-2191 item for material, environment, and aging effect. AMP is consistent with NUREG-2191 AMP.

D. Component is different, but consistent with NUREG-2191 item for material, environment, and aging effect. AMP takes some exceptions to the NUREG-2191 AMP.

E. Consistent with NUREG-2191 item for material, environment, and aging effect, but a different AMP is credited or NUREG-2191 identifies a plant-specific AMP.

F. Material not in NUREG-2191 for this component.

G. Environment not in NUREG-2191 for this component and material.

H. Aging effect not in NUREG-2191 for this component, material, and environment combination.

I. Aging effect in NUREG-2191 for this component, material, and environment combination is not applicable.

J. Neither the component nor the material and environment combination are evaluated in NUREG-2191.

Plant-Specific Notes

1. Determined on a plant-specific basis.

4.3 DEMONSTRATE THAT THE EFFECTS OF AGING ARE MANAGED

The Rule requires an applicant to demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the SPEO.

In performing the demonstration, an applicant should consider all programs and activities associated with the SC. Plant programs and activities that apply to the SCs or commodity groups should be reviewed to determine if they include actions to manage the effects of aging.

AMPs are generally of four types: prevention, mitigation, condition monitoring, and performance monitoring. Prevention programs preclude the aging effect from occurring; for example, coating programs to prevent external corrosion of a tank. Mitigation programs attempt to slow the effects of aging; for example, chemistry programs to mitigate internal corrosion of piping. Condition monitoring programs inspect, test, and examine for the presence of and extent of aging effects and for changes in material properties; for example, visual inspection of concrete structures for cracking and ultrasonic measurement of pipe wall for FAC induced wall thinning. Performance monitoring tests the ability of a SC to perform its intended function(s); for example, heat balances on heat exchangers for the heat transfer intended function of the tubes (see NEI 95-10, Rev. 6, Appendix C, Reference 1).

In some instances, more than one type of AMP may be implemented to ensure that the aging effects are adequately managed to ensure the intended function is maintained in the SPEO. For example, managing the internal corrosion of piping may rely on a mitigation program (water chemistry) to minimize susceptibility to corrosion and a condition monitoring program (ultrasonic inspection) to verify that the corrosion is insignificant.

The demonstration is not intended to be a reverification of the SC design basis. However, in some cases, verification of a specific design basis parameter may be necessary if that parameter or condition is affected by an aging effect and potentially results in a loss of SC intended function. This verification may consist of a physical measurement at susceptible locations or on a sampling basis, as justified, or an evaluation that demonstrates that the aging effect will be at a sufficiently slow rate such that the design basis parameter will not be reduced below a value necessary to assure that the intended function(s) will be maintained during the SPEO. For example, a SR piping component is designed to have structural integrity under design loads, such

as normal, upset, emergency, and faulted conditions, in accordance with the plant's CLB. An aging effect that should be evaluated for piping is loss of material due to FAC. A loss of material could result in pipe wall thinning below design values rendering the pipe unable to sustain its design loads. However, FAC affects piping differently depending on the material of construction. Carbon steel piping may be susceptible to loss of material due to FAC, and it would be appropriate to evaluate the pipe wall thickness to verify that this design value remains acceptable. Conversely, stainless steel piping is resistant to loss of material from FAC and this aging effect normally would not be significant and, thus, it would not be necessary to evaluate the pipe wall thickness to verify this design value.

To make the required demonstration, an applicant may elect to rely on a single program/activity or a combination of programs/activities. Once the applicant has determined the approach for making the demonstration (i.e., single program/activity, multiple programs/activities), the potential aging management program/activity will be evaluated for the 10 elements noted in Table 4.3-1. Hereafter, programs, aging management activities, or collections of aging management programs and activities used to manage an aging effect will be referred to as an AMP.

Figure 4.3-1 identifies three methods that can be used to review the acceptability of an AMP to manage aging in the SPEO. The following sections describe the three methods:

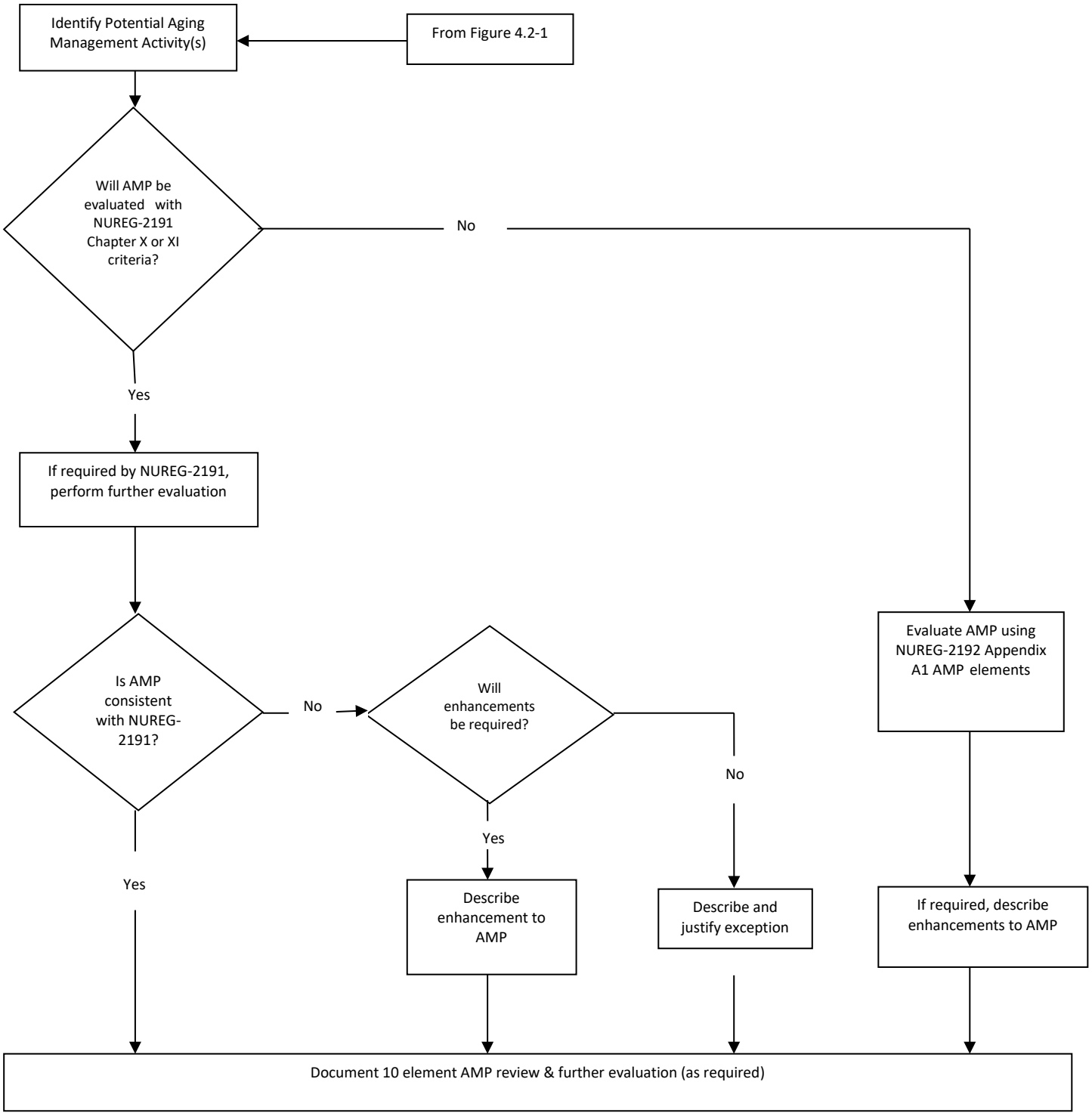
- Section 4.3.1 provides a method to review an AMP to demonstrate that the AMP corresponds to the AMP reviewed and approved in NUREG-2191, Volume 2, Section X or Section XI.

- Section 4.3.2 provides a method to perform a plant-specific evaluation of an AMP that is not described in NUREG-2191.

Table 4.3-1: Aging Management Activity 10 Program Elements

Element	Description
1. Scope of the Activity	Scope of the program/activity should include the specific SCs subject to AMR for SLR.
2. Preventive Actions	Preventive actions should mitigate or prevent aging degradation.
3. Parameters Monitored or Inspected	Parameters monitored or inspected should be linked to the degradation of the particular SC intended function(s).
4. Detection of Aging Effects	Detection of aging effects should occur before there is a loss of SC intended function(s). This includes aspects such as method or technique (e.g. 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 predictability of the extent of degradation and provide timely corrective or mitigating actions.
6. Acceptance Criteria	Acceptance criteria, against which the need for corrective action will be evaluated, should ensure that the SC intended function(s) are maintained under all CLB design conditions during the SPEO.
7. Corrective Actions	Corrective actions, including root cause determination and prevention recurrence, should be timely.
8. Confirmation Processes	Confirmation processes should ensure that preventive actions are adequate and that 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	OE of the aging management activity, including past corrective actions resulting in program enhancements or additional programs or activities, should provide objective evidence to ensure that the effects of aging will be adequately managed so that the intended functions of the SC will be maintained during the SPEO.

Figure 4.3-1: AMP Review Using GALL-SLR



4.3.1 AMP Review Using NUREG-2191

The existing plant program may be reviewed to confirm that it is "consistent with" each of the 10 elements of the generic program described in NUREG-2191 Section X or Section XI. NUREG-2191 documents the NRC staff's evaluation of generic AMPs found to be acceptable to manage aging effects. NUREG-2191 may be referenced in a SLRA and should be treated in the same manner as an NRC approved topical report. If each of the 10 elements in NUREG-2191 is applicable and consistent with the proposed plant program, the NRC should find that the reference to the NUREG-2191 AMP is acceptable and no further review is required. If an AMP in NUREG-2191 will be credited in a SLRA, it is incumbent on the applicant to verify that the conditions and OE at the plant are bounded by the conditions and OE for which the AMP in NUREG-2192 was evaluated.

Note that NUREG-2191 identifies one acceptable way to manage aging effects. Alternative methods to manage aging may be proposed in the SLRA. Although the use of NUREG-2191 is not required, its use should facilitate timely, uniform review by the NRC.

Exceptions
If a NUREG-2191 AMP is selected to manage aging, the existing plant program review should demonstrate consistency of the existing plant AMP elements with the NUREG-2191 AMP elements. Some engineering judgment may be used in determining that an existing plant program is "consistent with" NUREG-2191. When there is some expectation that the NRC staff may not come to the same determination with respect to the same program element, the differences should be identified and documented as exceptions to the NUREG-2191 AMP. Exceptions are portions of the NUREG-2191 AMPS in the GALL-SLR Report that the applicant does not intend to implement.

Exceptions to the NUREG-2191 AMP may include the following:

- Expansion of the existing plant program scope, or a new plant program, to include additional components, materials, environments, or aging effects/mechanisms not included in the NUREG-2191 AMP scope
- NUREG-2191 AMP requirements not met or satisfied by another plant aging management program
- A plant program frequency, acceptance criteria, or inspection technique that is different than the NUREG-2191 AMP
- Documentation requirements that are different than the NUREG-2191 AMP.
- Invoking a different industry standard revision than specified in the NUREG-2191 AMP (note that this is not an exception for specific NUREG-2191 AMPs).
- Plant specific OE that is different than that assumed in the NUREG-2191 AMP
- Other differences between the plant program and the NUREG-2191 AMP.

Any exceptions of the plant program to the NUREG-2191 AMP elements should be described and justified. The justification may use an analysis, propose an alternate technique, or provide other considerations to confirm that the exception, when considered in conjunction with the remainder of the 10 elements, would demonstrate that the effects of aging will be adequately managed. The justification may entail identification that the exception was approved for a

previous renewed license for the plant under review, but must demonstrate that the exception is justified for the SPEO. Additionally, the applicant may propose exceptions that are based on exceptions that the NRC has approved in other plant's SLRAs, as documented in the SLR SER for the other plant. The applicant must demonstrate that the conditions associated with the exception approved by the NRC in another plant's SLR SER can be supported by the plant's design and CLB. The applicant also must consider any revisions to NUREG-2191, SLR-ISGs, or industry Operating Experience that may affect the NRC's evaluation of the AMP.

Certain line items in NUREG-2191 mechanical, electrical, and structural sections identify AMPs that are subject to further evaluation to augment the specified NUREG-2191 AMP. When required, NUREG- 2191 further evaluations must be documented and their conclusions presented in conjunction with the results of the NUREG-2191 AMP evaluation for NRC review.

Enhancements

There may be an existing plant program where all the NUREG-2191 AMP recommendations cannot be satisfied without appropriate enhancements to the existing plant AMP or preparation of a new plant program may be needed. Enhancements are revisions or additions to existing plant program(s) that will be committed for implementation prior to the SPEO. Enhancements may expand the scope of the existing plant program to align with the NUREG-2191 AMP. Enhancements may include, but are not limited to, verification of specific design values by inspection(s), adding steps to an existing plant program for specific aging effects, changing the frequency of the required task, adding specific aging effects mitigation procedures, or changing the record-keeping requirements. The factors that should be considered when selecting an appropriate enhancement include:

- The risk significance of the SC;
- The nature of the aging effect (i.e., is it readily apparent/easily detected?);
- The feasibility of repair/replacement of the affected SC;
- The compatibility/adaptability of existing programs to detect and manage the aging effect(s);
- The existence of technology to detect and manage the aging effect(s); and
- The estimated cost, personnel radiation exposure, and impact on normally scheduled outage duration for determining the enhancement.

If existing plant programs, with or without enhancements, are not adequate for managing the effects of aging, new programs or other actions shall be developed as appropriate. One action an applicant could use is a One-Time Inspection Program as discussed in NUREG-2191, Section XI.M32. It is possible that an applicant is already performing a relevant inspection or has previously performed an inspection that produced appropriate data for SLR. Other actions for consideration are refurbishment or replacement.

Enhancement of existing plant programs or crediting of new plant programs may result in changes to the plant CLB. § 54.29, Standards for issuance of a renewed license, indicates that changes may be made to the plant's CLB in order to comply with the requirement to manage the effects of aging during the "subsequent" PEO.

Quality Assurance and Administrative Controls

Existing 10 CFR 50, Appendix B, Quality Assurance Programs may be used to generically address the AMP elements of corrective actions, confirmation process, and administrative controls for SR SSCs WSLR. For NSR SCs subject to an AMR, the existing 10 CFR 50, Appendix B, Quality Assurance Program may be used to address the AMP elements of corrective actions, confirmation process, and administrative controls. Alternative means to address the elements of corrective actions, confirmation process, and administrative controls for managing aging of NSR SCs that are subject to AMR may be used but should be consistent with the guidance in NUREG-2192, Appendix A.1 for the applicable elements.

4.3.2 Plant-Specific AMP Review

NUREG-2191 identifies acceptable AMPs to manage aging effects. Alternative (plant-specific) methods to manage aging may be proposed in the SLRA. Plant-specific AMPs should be described in terms of the 10 program elements noted in Figure 4.3-1 and the guidance in NUREG-2192, Appendix A.1, "Aging Management Review – Generic (Branch Technical Position RLSB-1)."

The following should be considered when performing a plant-specific AMP review:

- Parameters monitored/inspected: This element should include observable parameters or indicators to be monitored or inspected for each aging effect managed. The observable parameters should be linked to the degradation of the SC intended functions in the SPEO.

- The plant-specific AMR should either (1) identify an AMP that detects the effects of aging before the SC would lose the ability to perform its intended function, or (2) demonstrate that the SC intended function will be maintained during the SPEO without the need for an AMP.

- When an inspection is necessary, sampling may be used to evaluate a group of SCs. If sampling is used, the program description should describe and justify the methods used for selecting the population and the sample size. A sample consists of one or more SCs drawn from the scope. The applicant must determine a sample size that is adequate to provide reasonable assurance that the effects of aging on the SC population will not prevent the performance of intended functions during the SPEO. The size of the sample should include consideration of the specific aging effect, location, existing technical information, materials of construction, service environment, previous failure history, etc. The sample should be biased toward locations most susceptible to the specific aging effect of concern. The results of the inspection also should be evaluated to assess whether the sample size is adequate or if it needs to be expanded.

- An inspection for SLR may be performed prior to submittal of the SLRA. The SLRA may include a commitment to perform an inspection prior to the commencement of the SPEO. There also may be justification for performing the inspection during the SPEO.

- AMP elements of corrective actions, confirmation process, and administrative controls were previously addressed in the "Quality Assurance and Administrative Controls" portion of Section 4.3.1.

4.4 OE REVIEW

Industry and plant-specific OE requires review to identify AERMs that are not identified by the industry guidance documents (such as EPRI tools) and to confirm the effectiveness of AMPs.

OE – AERMs
A plant-specific OE review should assess the operating and maintenance history. A review of the prior five to ten years or back to the first LRA OE cut-off date of operating and maintenance history should be sufficient. The results of the review should confirm consistency with documented industry OE. Differences with previously documented industry experience such as new aging effects or lack of aging effects allow consideration of plant-specific aging management requirements.

OE with AMPs
Plant-specific OE with existing programs must be considered. The OE of AMPs during the first PEO, including past corrective actions resulting in program enhancements or additional programs, must 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 SPEO. Guidance for reviewing industry OE is presented in BTP RLSB-1 in Appendix A.1 of the Branch Technical Positions in NUREG-2192. Appendix A.4 also addresses AMP OE and AMP effectiveness considerations from the previous PEO. Also NEI 14-12 (Reference 27) as described in section 1.1 should be considered. See NEI 17-01, Appendix B, Section 6, "Appendix B of the SLRA – Aging Management Programs (AMPs)," for additional guidance on enhancements to the OE discussions relative to the discussion in the previous LRA submittals.

Industry OE
Industry OE and its applicability should be assessed to determine whether it changes plant-specific determinations. NUREG-2191 is based upon industry OE prior to its date of issue. OE after the issue date of NUREG-2191 should be evaluated and documented as part of the AMR. In particular, generic communications such as a bulletin 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. Also NEI 14-13 (Reference 28) as described in section 1.1 should be considered.

4.5 DOCUMENTING THE IPA

Section 54.37(a) of the Rule requires applicants to retain in an auditable and retrievable form all information and documentation required by, or otherwise necessary to document compliance with, the provisions of the Rule.

The results of the IPA should be documented in a format consistent with other plant documentation practices. The information may be maintained in hard-copy or electronic format. It may be appropriate to incorporate the information into an existing plant database if available. The applicant should use the quality assurance program in effect at the plant when documenting the results of the IPA.

4.5.1 Documenting the Identification of SCs Subject to an AMR

The information to be documented and retained by the applicant should include:

- An identification and listing of SCs subject to an AMR and the intended functions;
- A description and justification of the methods used to determine the SCs that are subject to AMR; and
- The information sources used to accomplish the above, and any discussion needed to clarify their use.

The information documented and retained by the applicant will form the bases of the information contained in the application as further discussed in Section 6.

4.5.2 Documenting the AMR

The information to be documented by the applicant should include:

- An identification of the AERMs;
- An identification of the specific programs or activities that will manage the effects of aging for each SC or commodity group listed;
- A description of how the programs and activities will manage the effects of aging;
- A discussion of how the determinations were made;
- A list of substantiating references and source documents;
- A discussion of any assumptions or special conditions used in applying or interpreting the source documents; and
- A description of AMPs credited for SLR.

The information documented and retained by the applicant will form the bases of the information contained in the SLRA as further discussed in Section 6.

5 TLAAS INCLUDING EXEMPTIONS

The Rule requires that TLAAs be evaluated. It is intended that TLAAs will capture certain plant- specific aging analyses that are explicitly based on the current operating term of the plant. In addition, the Rule requires exemptions, in effect, granted under 10 CFR 50.12 that are based on TLAAs be identified and analyzed to justify continuation into the SPEO. Figure 5.0-1 outlines the process for evaluating potential TLAAs and exemptions that are in effect to determine if the potential TLAAs and exemptions meet the six criteria to be a TLAA. Potential TLAAs and exemptions based on TLAAs are then evaluated to determine that the TLAA is valid for the subsequent PEO.

5.1 TLAAs

Part 54 Reference

§54.3

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Time-limited aging analyses, for the purposes of this part, are those licensee calculations and analyses that:

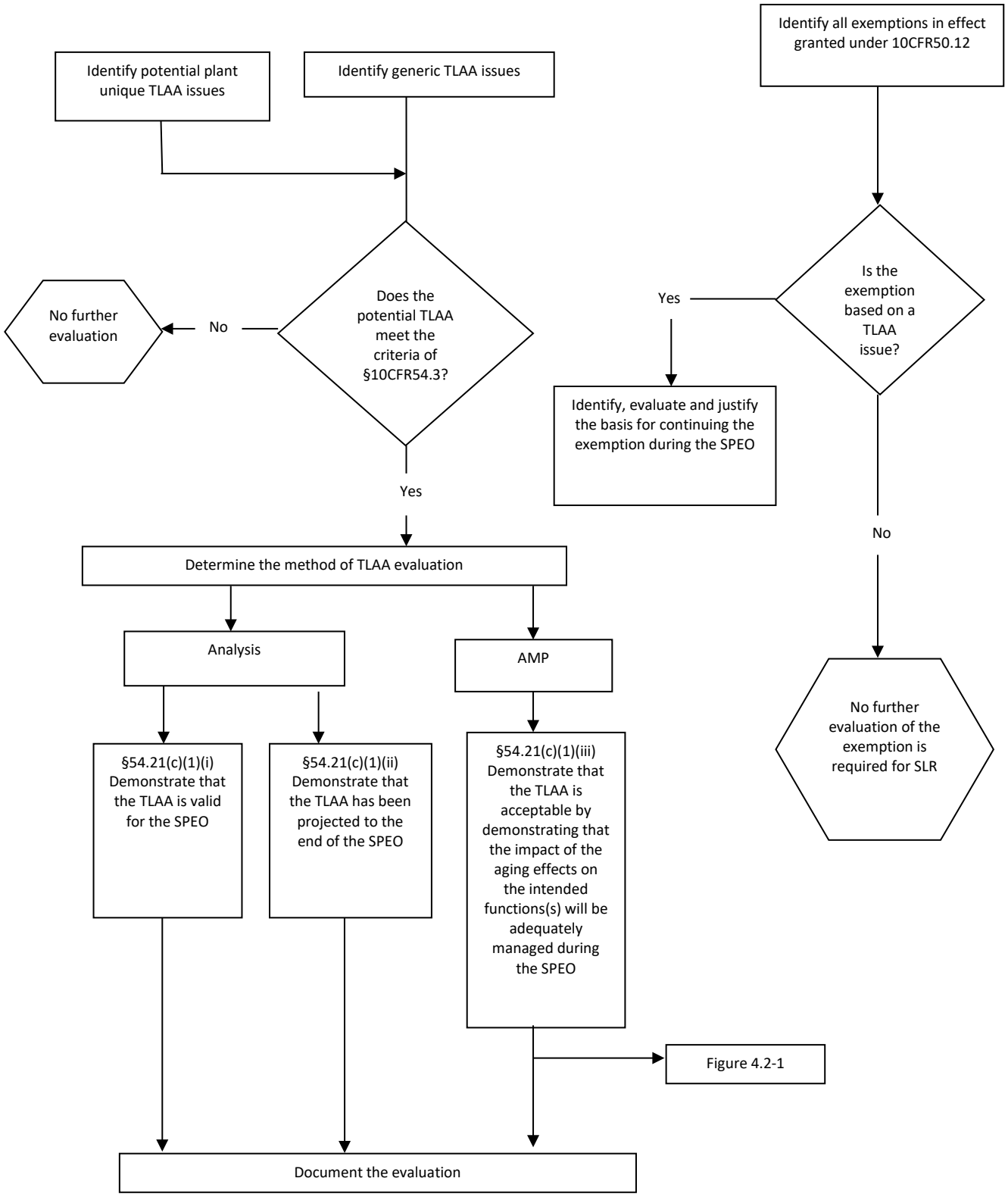
(1) Involve systems, structures, and components within the scope of license renewal, as delineated in §54.4(a);
(2) Consider the effects of aging;
(3) Involve time-limited assumptions defined by the current operating term, for example, 40 years;
(4) Were determined to be relevant by the licensee in making 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 §54.4(b); and
(6) Are contained or incorporated by reference in the CLB.

§54.21(c)(1)

(1) A list of time-limited aging analyses, as defined in §54.3, must be provided. The applicant shall 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.

Figure 5.0-1: Evaluation of TLAAs and Exemptions [§ 54.21(c)]



The applicant must identify the plant-specific TLAA by applying the six criteria delineated in §54.3. The criteria may be applied in any order depending on plant- specific document search capabilities. Guidance for applying the six criteria is provided below.

- Involve SSCs WSLR as delineated in §54.4(a). The SSC scoping step of the IPA (Section 3.0) should be performed prior to or concurrent with the TLAA identification. (TLAAs may involve active and/or passive components)

- Consider the effects of aging. The effects of aging include, but are not limited to, loss of material, loss of toughness, loss of pre-stress, settlement, cracking, and loss of dielectric properties.

- Involve time-limited assumptions defined by the current operating term; e.g., 60 years. The defined operating term should be explicit in the analysis. Simply asserting that a component is designed for a service life or plant life is not sufficient. The assertion should be supported by calculations or other analyses that explicitly include a time limit.

- Were determined to be relevant by the licensee in making a safety determination. Relevancy is a determination that the licensee must make based on a review of the information available. A calculation or analysis is relevant if it can be shown to have direct bearing on the action taken as a result of the analysis performed. Analyses are also relevant if they provide the basis for the licensee's safety determination and, in the absence of the analyses, the licensee may have reached a different safety conclusion.

- Involve conclusions or provide the basis for conclusions related to the capability of the SSC to perform its intended functions as delineated in §54.4(b). As stated in the first criterion, the intended functions must be identified prior to or concurrent with the TLAA identification. Analyses that do not affect the intended functions of the SSCs are not TLAAs.

- Are contained or incorporated by reference in the CLB. Plant-specific documents contained or incorporated by reference in the CLB include the UFSAR, SERs, Technical Specifications, the fire protection plan/hazards analyses, correspondence to and from the NRC, QA plan, topical reports included as references within the UFSAR or correspondence to the NRC. Calculations and analyses that are not in the CLB or not incorporated by reference are not TLAAs. When the code of record is mentioned in the UFSAR, for particular groups of SCs, referenced material includes all calculations required by that code of record for those SCs.

All six criteria must be satisfied to conclude that a calculation or analysis is a TLAA. As an aid to applicants, Table 5.1-1 provides examples of how the six criteria may be applied and Table 5.1-2 lists potential TLAAs that have been identified from the industry's review of plant-specific CLB documents, various codes, standards, and regulatory documents. The table also identifies TLAA considerations that are specifically identified in NUREG-2192, Section 4.

TLAAs that need to be addressed are not necessarily limited to those analyses that have been previously reviewed or approved by the NRC. The following examples illustrate TLAAs that need to be addressed and were not previously reviewed and approved by the NRC:

- The UFSAR states that the design complies with a certain national code and standard. A review of the code and standard reveals that an analysis or calculation is required. Some of these calculations or analyses will be TLAAs. The actual calculation was performed by the licensee to meet code and standard requirements. The specific calculation was not referenced in the UFSAR. The NRC has not reviewed the calculation.

- In response to a generic letter, a licensee submitted a letter to the NRC committing to perform a TLAA that would address the concern in the generic letter. The NRC had not documented a review of the licensee's response and had not reviewed the actual analysis.

The following examples illustrate analyses that are not TLAAs and need not be addressed under 10 CFR 54.21(c):

- Population projections;

- Cost-benefit analysis for plant modifications; or

- Analysis with time-limited assumptions defined short of the current operating term of the plant; for example, an analysis for a component based on a service life that would not reach the end of the current operating term.

Identified plant-specific TLAAs must be demonstrated acceptable in accordance with §54.21(c)(1) of the Rule. One approach is to verify that the analysis remains valid for the SPEO. Guidance for this approach is provided under Section 5.1.1. Another approach is to verify that the analysis can be projected to the end of the SPEO. Guidance for this approach is provided in Section 5.1.2. A third approach is to show that the effects of aging on the intended function(s) will be adequately managed for the SPEO. Guidance for this approach is provided in Section 5.1.3.

5.1.1 Verify that the TLAA Is Valid for the SPEO

There may be cases where the original analysis or efforts to address new issues during plant operation have resulted in an analysis that can be demonstrated to remain valid for the SPEO. A SC may have been qualified for at least 60 years. A detailed review of the analysis may demonstrate that the qualification is valid for the SPEO and no reanalysis is required. An acceptable approach for verifying that the TLAA remains valid is described in the following paragraphs.

The TLAA issue should be described with respect to the objective(s) of the analysis, conditions and assumptions used in the analysis, acceptance criteria, AERMs, and intended function(s). It should be demonstrated that (1) the conditions and assumptions used in the analysis already address the AERM(s) for the SPEO, and (2) acceptance criteria are maintained to provide reasonable assurance that the intended function(s) is maintained.

Any actions and an associated implementation plan for reconciling the affected TLAA source documents should be identified.

5.1.2 Justifying the TLAA Can Be Projected to the End of the SPEO

The current TLAA may not be valid for the SPEO; however, it may be possible to revise the TLAA by simply projecting the analysis to the end of the subsequent period of extended operation and showing that the analysis continues to meet its acceptance criterion, and therefore demonstrating that the analysis has been projected for the SPEO in accordance with 10 CFR 54.21(c)(1)(ii). The projection of the analysis may recognize and reevaluate any conservative conditions and assumptions used in the original analysis, as long as the changes in the conditions and assumptions are explained and justified in the SLRA. Examples include relaxing overly conservative assumptions in the original analysis, using new or refined analytical techniques and/or performing the analysis using an 80-year life. The TLAA may then be shown to be valid for SPEO.

5.1.3 Verify that the TLAA is Resolved by Managing the Aging Effects

The SC(s) associated with the TLAA should be identified. The TLAA should be described with respect to the objectives of the analysis, conditions and assumptions used in the analysis, acceptance criteria, AERM(s) and intended function(s). The guidance provided in Section 4.2 may be used to identify an appropriate AMP and demonstrate that the effects of aging on the intended function are adequately managed by this AMP for the SPEO. Also, the monitoring of the aging effect analyzed in the TLAA may include future inspection/examination to detect the aging effect. See NUREG-2191, Section X for TLAA-specific programs the NRC has evaluated.

If a sampling based inspection program is cited as the basis for accepting the TLAA under §54.21(c)(1)(iii), the AMP must include inspections of the SCs that are within the scope of the TLAA and must include the schedule for inspection of the SCs that are within the scope of the TLAA. The aging management basis and timing of inspections for the SCs should be justified as part of the basis for accepting the TLAA in accordance with 54.21(c)(1)(iii).

5.1.4 Timing for Evaluation of TLAA

The regulation in 10 CFR 54.21(c)(1) requires that the SLRA include an evaluation of any analysis, calculation, or evaluation in the CLB that conforms to the definition of a TLAA in 10 CFR 54.3(a) and to provide the basis for demonstrating the TLAA is acceptable in accordance with 10 CFR 54.21(c)(1)(i), (ii), or (iii). For TLAAs that are subject to a regulatory process provision in 10 CFR Part 50 or the plant's license (including Technical Specification provisions) that specify specific reporting requirements for submitting plant analyses, alternate inspection or evaluation criteria, or timing for performing and reporting corrective actions, the applicant may use those regulatory processes as the basis for demonstrating acceptance of the TLAAs in accordance with the criterion in 10 CFR 54.21(c)(1)(iii).

One example would be updates to pressure-temperature (P-T) limits, which can be addressed through (a) the 10 CFR 50.90 process for updating P-T limits in Technical Specification LCOs, or (b) for CLBs with approved P-T limit report (PTLR) update processes, the process delineated in the Administrative Controls Section of the plant Technical Specifications for updating the P-T limits contained in the PTLRs or Technical Requirements Manual (TRM) and reporting those changes to the NRC (for information). This scenario would also apply to cases where specific Part

50 requirements are not met. An example of this would be a PTS TLAA that does not meet the screening criteria in 10 CFR 50.61 (or alternatively 10 CFR 50.61a), in which the rules provide specific acceptance criteria, corrective actions, and timing requirements for submitting corrective actions for staff approval.

Table 5.1-1: Disposition Of Potential TLAAs And Basis For Disposition

Example	Disposition
NRC correspondence requests a utility to justify that unacceptable cumulative wear did not occur during the design life of control rods.	This example does not qualify as a TLAA because the design life of control rods is less than 40 years. Therefore, does not meet criterion (3) of the TLAA definition in § 54.3.
Maximum wind speed of 100 mph is expected to occur once per 50 years.	This is not a TLAA. Does not involve an aging effect.
Correspondence from the utility to the NRC states that the membrane on the containment basemat is certified by the vendor to last for 40 years.	This example does not meet criterion (4) of the TLAA definition in § 54.3 and, therefore, is not considered a TLAA. The membrane was not credited in any safety evaluation.
Fatigue usage factor for the pressurizer surge line was determined not to be an issue for the current license period in response to NRC Bulletin 88-11.	This example is a TLAA because it meets all six criteria in the definition of TLAA in § 54.3. The utility's fatigue design basis relies on assumptions related to 40 year operating life for this component. Plant specific data could be used but is more difficult due to thermal stratification.
Containment tendon liftoff forces are calculated for the initial 40-year life of the plant. This data is used during Technical Specification surveillance for comparing measured to predicted liftoff forces.	This example is a TLAA because it meets all six criteria of the TLAA definition in § 54.3. The liftoff force curves are limited to 40 year values currently and are needed to perform a required Technical Specification surveillance.

Table 5.1-2: Potential TLAAs

TLAA	NUREG-2192 TLAA Considerations
Reactor Vessel Neutron Embrittlement	- Upper-Shelf Energy - Pressurized Thermal Shock (PWRs) - Pressure-Temperature (P-T) Limits - Elimination of Circumferential Weld Inspection (for BWRs) - Axial Welds (for BWRs)
Metal Fatigue Analysis	- ASME Section III, Class 1 - ANSI B31.1 - Other Evaluations Based on CUF - ASME Section III, Class 2 and 3 - Cycle-dependent Fracture Mechanics or Flaw Evaluations - Cycle-dependent Fatigue Waivers
Environmental Qualification of Electrical Equipment	- DOR Guidelines - NUREG-0588, Category II (IEEE Std 323-1971) - NUREG-0588, Category I (IEEE Std 323-1974) - GSI 168
Concrete Containment Tendon Prestress	- Concrete Containment Tendon Prestress Analysis
Containment Liner Plate, Metal Containments and Penetrations Fatigue Analysis	- ASME Section III, MC or Class 1 - Other Evaluations Based on CUF
Other Plant-Specific TLAAs	- See Note

Note: NUREG-2192 provides general guidance for plant-specific TLAAs. Some examples of plant- specific TLAAs identified in previous LRAs include:

- In-service flaw growth analyses that demonstrate structure stability for 40 years
- Containment penetration pressurization cycles
- Fatigue analysis of polar crane (Crane cycle load limits)
- Reactor Coolant Pump Fly Wheel
- Leak-Before-Break Analysis
- Service Water Intake Structure Settlement
- CE-half-nozzle design and mechanical nozzle seal assemblies

See Table 4.7-1 in NUREG-2192 for examples of other potential plant specific TLAA topics

5.2 EXEMPTIONS

Part 54 Reference

§54.21(c)(2)

(3) A list must be provided of all plant-specific exemptions granted pursuant to 10 CFR 50.12 and in effect that are based on time-limited aging analyses as defined in §54.3. The applicant shall provide an evaluation that justifies the continuation of these exemptions for the period of extended operation

Section 54.21(c)(2) of the Rule requires that a list of all exemptions granted under 10 CFR 50.12 that are in effect and based on a TLAA be provided along with the evaluation of TLAAs.

Identification of an exemption may require the review of correspondence between the NRC and the plant. Many plants have licensing commitment tracking systems or databases of information on licensing documents. As an alternate method or as verification to the search, the NRC's ADAMS may be utilized to search for licensing correspondence and, thus, exemptions granted.

It should be determined that the exemption granted pursuant to 10 CFR 50.12 will be in effect during the SPEO, involves a SSC WSLR and involves a time-limited aging issue. If all of these conditions apply, then an evaluation of the exemption must be performed to justify continuing the exemption during the SPEO. The TLAA within the exemption is evaluated using the guidance in Section 5.1.

The scope of the exemption, the analysis that forms the basis for the exemption, and the affected SC(s) and/or the TLAA should be identified. The analysis that forms the basis for the exemption may have been identified during the evaluation of the TLAAs.

The exemption should be evaluated to determine its effect on the capability of the associated plant programs to detect or mitigate the effects of aging or on the conditions and assumptions used in the TLAA for the SPEO. The evaluation of the associated TLAA may provide sufficient justification to continue the exemption.

5.3 DOCUMENTING THE EVALUATION OF THE TLAAS AND EXEMPTIONS

Section 54.37(a) of the Rule requires applicants to retain in an auditable and retrievable form all information and documentation required by, or otherwise necessary to document compliance with, the provisions of the Rule.

The results of the TLAAs and exemptions evaluation should be documented in a format consistent with other plant documentation practices. The information may be maintained in hard-copy or electronic format. If available and appropriate, the information may be incorporated into an existing plant database. The applicant should use the quality assurance program in effect at the plant when documenting the results of the TLAAs and exemptions evaluation.

The information to be documented by the applicant should include:

- A list of the TLAAs and exemptions applicable to the plant;
- A description of the evaluation performed or to be performed on each plant- specific TLAA and exemption;
- A general discussion of how the determinations were made;
- A list of substantiating references and source documents; and
- A discussion of any assumptions or special conditions used in applying or interpreting the source documents.

The information documented and retained by the applicant will form the bases of the information contained in the application as further discussed in Chapter 6.

6 SLRA FORMAT AND CONTENT

The standard SLRA format is presented in Table 6.2-1. Table 6.2-2 provides guidance for preparing the standard SLRA. Contents of the SLRA are general information required by §54.17 and §54.19 and technical information required by §54.21, §54.22 and §54.23.

6.1 GENERAL INFORMATION

The SLRA contains the technical information that the NRC staff will review to determine if the effects of aging on long-lived, passive SCs are being managed such that the associated intended functions are maintained consistent with the CLB in the SPEO. The technical information must be of sufficient detail to allow the NRC to make the finding that there is reasonable assurance that the activities authorized by the renewed license will continue to be in accordance with the CLB (§54.29(b)).

The application should contain clear and concise presentations of the required information. Confusing or ambiguous statements and unnecessarily verbose descriptions do not contribute to expeditious technical review. Claims of adequacy in the AMR should be supported by technical bases. The level of detail contained in the application should be commensurate with the requirements of the Rule.

The NRC staff reviewers will use NUREG-2191 and NUREG-2192 during their evaluation of the SLRA. An applicant should consider addressing differences from NUREG-2192 in the SLRA. Generally, applicants will find it beneficial to credit many of the NUREG-2191 evaluations of AMPs. NUREG-2191 provides one way to manage the aging effects. Other programs may be demonstrated to be adequate. Section 4.3 of this guideline identifies three methods that can be used to demonstrate that the effects of aging are managed. The SLRA is based on the information contained in plant- specific documentation as described in Sections 3.3, 4.3, and 5.3 of this guideline. However, detailed procedures/calculations need not be included in the SLRA. Once the license is issued the application is a historical licensing document and is not required to be updated.

6.2 SLRA FORMAT AND CONTENT GUIDANCE

This section provides the standard SLRA format. Table 6.2-1 is the SLRA Table of Contents. Guidance for preparing the information for each section of the SLRA is provided in Table 6.2-2. Additional guidelines are provided in Appendix B. This format was developed by applicants who planned submittals to NRC in 2003 and has since been standardized.

Table 6.2-1: Standard SLRA Format

1	**ADMINISTRATIVE INFORMATION**
2	**SCOPING AND SCREENING METHODOLOGY FOR IDENTIFYING SCs SUBJECT TO AMR AND IMPLEMENTATION RESULTS**
2.1	Scoping and Screening Methodology
2.2	Plant Level Scoping Results
2.3	Scoping and Screening Results: Mechanical Systems
2.3.1	Reactor Coolant System
2.3.2	Engineered Safety Features
2.3.3	Auxiliary Systems
2.3.4	Steam and Power Conversion System
2.4	Scoping and Screening Results: Structures
2.5	Scoping and Screening Results: Electrical and Instrumentation and Controls Systems
3	**AMR RESULTS**
3.1	Aging Management of Reactor Vessel, Internals and Reactor Coolant System
3.2	Aging Management of Engineered Safety Features
3.3	Aging Management of Auxiliary Systems
3.4	Aging Management of Steam and Power Conversion System
3.5	Aging Management of Containments, Structures and Component Supports
3.6	Aging Management of Electrical and Instrumentation and Controls
4	**TLAAs**
4.1	Identification of TLAAs
4.2	Reactor Vessel Neutron Embrittlement Analysis
4.3	Metal Fatigue Analysis
4.4	EQ of Electrical Equipment
4.5	Concrete Containment Tendon Prestress Analysis
4.6	Containment Liner Plate, Metal Containments and Penetrations Fatigue Analysis
4.7	Other Plant-Specific TLAAs

APPENDICES
A: UFSAR SUPPLEMENT
B: AMPs AND ACTIVITIES
C: (OPTIONAL)
D: TECHNICAL SPECIFICATION CHANGES
E: ENVIRONMENTAL INFORMATION

Table 6.2-2: Guidance for Preparing the Standard SLRA Format

1 ADMINISTRATIVE INFORMATION

The following information, required by §54.17 and §54.19, is consistent with the information contained in the facility's original operating license application as delineated in 10 CFR 50.33(a) through (e), (h) and (i):

(1) Name of applicant.
(2) Address of applicant.
(3) Description of business or occupation of applicant.
(4) Organization and management of applicant.
Note that the Rule prohibits any person who is a citizen, national, or agent of a foreign country, or any corporation, or other entity which the Commission knows or has reason to know is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government, from applying for and obtaining a renewed license.
(5) Class of License, the use of the facility, and the period of time for which the license is sought.
(6) Earliest and latest dates for alterations, if proposed.
(7) Listing of regulatory agencies having jurisdiction and appropriate news publications (if applicable).
(8) Conforming changes to the standard indemnity agreement
(9) Restricted data agreement
Pursuant to §54.17 (f) and (g): If the application contains Restricted Data or other defense information, it must be prepared in such a manner that all Restricted Data and other defense information are separated from unclassified information in accordance with 10 CFR 50.33(j). As part of its application and in any event prior to the receipt of Restricted Data or the issuance of a renewed license, the applicant shall agree in writing that it will not permit any individual to have access to Restricted Data until an investigation is made and reported to the Commission on the character, association, and loyalty of the individual and the Commission shall have determined that permitting such persons to have access to Restricted Data will not endanger the common defense and security. The agreement of the applicant in this regard is part of the renewed license, whether so stated or not.

The contents specified for the application are the minimum set required by the regulations. Upon issuance of the renewed operating license, this part of the application becomes a historical document with no further revisions.

2 SCOPING AND SCREENING METHODOLOGY FOR IDENTIFYING SCs SUBJECT TO AMR AND IMPLEMENTATION RESULTS

Guidance:

- This subsection provides a brief introduction to Section 2. In addition, it contains Table 2-1, "Intended Functions Abbreviations & Definitions," which contains the meanings for the abbreviations used in the screening and AMR results tables to represent the intended functions for SCs.

2.1. Scoping and Screening Methodology

Guidance:

- Describe and justify the methodology used to determine the SSCs WSLR and the SCs subject to an AMR [.§54.21(a)(2)].
- The scoping and screening method for mechanical, electrical, and civil/structural disciplines may vary. In such cases each method should be described and justified.
- Identify the set of plant-specific design basis events, and corresponding set of plant-specific nomenclature, that the applicant relied on, or that form the basis, to determine the scope of SSCs required in §54.4, consistent with the plant's CLB. Presenting this information in a table or matrix may make the NRC's review more efficient.
- To the extent the Maintenance Rule scoping criteria are the same for the Rule, licensees may use the same methodology.
- An applicant may attempt to make the NRC review of the SLRA more efficient by indicating its position regarding the subject of any LR ISGs under development at the time of SLRA submittal.

2.2 Plant Level Scoping Results

Guidance:

- Provide a list of all the plant systems and structures identifying those that are WSLR. For example, a list may contain 135 plant systems and structures, identifying only 37 that are WSLR. If the list exists elsewhere, such as in the UFSAR, it is acceptable to merely identify that linkage.
- The Rule does not require the identification of all plant systems and structures. However, providing such a list may make the NRC's review more efficient.

2.3 System Scoping and Screening Results: Mechanical Systems

2.3.1 Reactor Coolant System

Guidance:

- For each system, provide the following information: system description to the level of detail that it can be used in the SER, system intended functions, UFSAR references, reference to drawings submitted with or as part of the SLRA, a table of component types requiring AMR with their intended functions and a reference to the Section 3 tables with the AMR results for the component types [Ref. §54.21(a)(1)].
- Information concerning interface/boundaries and components/commodities can be described in the text or provided in the form of drawings provided as part of the application or under separate cover.

2.3.2 Engineered Safety Features

Guidance:

- For each system, provide the following information: system description to the level of detail that it can be used in the SER, system intended functions, UFSAR references, reference to drawings submitted with or as part of the SLRA, a table of component types requiring AMR with their intended functions and a reference to the Section 3 tables with the AMR results for the component types [Ref. §54.21(a)(1)].
- Information concerning interface/boundaries and components/commodities can be described in the text or provided in the form of drawings provided as part of the application or under separate cover.

2.3.3 Auxiliary Systems

Guidance:

- For each system, provide the following information: system description to the level of detail that it can be used in the SER, system intended functions, UFSAR references, reference to drawings submitted with or as part of the SLRA, a table of component types requiring AMR with their intended functions and a reference to the Section 3 tables with the AMR results for the component types [Ref. §54.21(a)(1)].
- Information concerning interface/boundaries and components/commodities can be described in the text or provided in the form of drawings provided as part of the application or under separate cover.

2.3.4 Steam and Power Conversion System

Guidance:

- For each system, provide the following information: system description to the level of detail that it can be used in the SER, system intended functions, UFSAR references, reference to drawings submitted with or as part of the SLRA, a table of component types requiring AMR with their intended functions and a reference to the Section 3 tables with the AMR results for the component types [Ref. §54.21(a)(1)].
- Information concerning interface/boundaries and components/commodities can be described in the text or provided in the form of drawings provided as part of the application or under separate cover.

2.4 Scoping and Screening Results: Structures

Guidance:

- For each structure, including component supports, subject to AMR, provide the following information: description to the level of detail that it can be used in the SER, intended functions, UFSAR references, reference to drawings submitted with or as part of the SLRA, a table of component types requiring AMR with their intended functions and a reference to the Section 3 tables with the AMR results for the component types [Ref. §54.21(a)(1)].
- Information concerning interface/boundaries and components/commodities can be described in the text or provided in the form of drawings provided as part of the application or under separate cover.

2.5 Scoping and Screening Results: Electrical and Instrumentation and Controls Systems

Guidance:

- Identify electrical and instrumentation and control component types subject to an AMR [Ref. § 54.21(a)(1)]. For each electrical and instrumentation and control component type provide the following information: description to the level of detail that it can be used in the SER, intended functions, UFSAR references, reference to drawings submitted (if applicable) with or as part of the application, a table of component types requiring AMR with their intended functions and a reference to the Section 3 tables with the AMR results for the component types [Ref. §54.21(a)(1)].
- Information concerning interface/boundaries and components/commodities can be described in the text or provided in the form of drawings provided as part of the application or under separate cover.

3 AMR RESULTS

Guidance:

This subsection contains the roadmap for all of Section 3. It identifies where the tables are located (with hyperlinks) that identify the internal and external environments for the SSCs that are subject to AMR. It also identifies where the table of definitions for abbreviations that are used in Section 3 is located (along with its hyperlink). In addition, it includes the following two subsections:

- Table Description
  The purpose of Section 3 of the LRA is to present the results of the AMRs. The table description section of the LRA describes the two tables that have been developed to present the AMR results information. It describes each column and defines the type of information that each column should contain, including level of detail, where appropriate.
- Table Usage
  This section describes how the two tables work together to present all of the needed information to the reviewer.

3.1 Aging Management of Reactor Vessel, Internals, and Reactor Coolant System

Guidance

This subsection is further broken into four subsections.

- The introduction provides the road map for the remainder of Subsection 3.1. It lists the section of the SLRA where the Reactor Vessel, Internals, and Reactor Coolant System SSCs are identified (including a hyperlink). It also lists the systems, or portions of systems, that are addressed in this subsection. Finally, it contains:
  Table 3.1.1, which presents the subsystem information, correlated to the data from Volume 1 of NUREG-2191.
- The results contain tables that summarize the AMRs for the systems. This subsection also contains a summary of the materials, environments, AERMs, and AMPs for each subsystem within the Reactor Vessel, Internals, and Reactor Coolant System. Finally, it includes all of the Further Evaluation Recommended information associated with the Reactor Vessel, Internals, and Reactor Coolant System. NUREG-2191 and NUREG-2192 indicate which elements of the program need to be evaluated by the NRC reviewer. This section provides

the plant-specific information required for this evaluation.
- The conclusion contains a conclusion statement regarding the ability of the selected AMPs to manage the effects of aging on the SCs that are subject to AMR for the Reactor Vessel, Internals, and Reactor Coolant System.
- A list of references is provided.

3.2 Aging Management of Engineered Safety Features

Guidance:

This subsection is further broken into four subsections.
- The introduction provides the road map for the remainder of Subsection 3.2. It lists the section of the SLRA where the Engineered Safety Features SSCs are identified (including a hyperlink). It also lists the systems, or portions of systems, that are addressed in this subsection. Finally, it contains Table 3.2.1, which presents the subsystem information, correlated to the data from Volume 1 of NUREG-2191.
- The results contain tables that summarize the AMRs for the systems. This subsection also contains a summary of the materials, environments, AERMs and AMPs for each subsystem within the Engineered Safety Features. Finally, it includes all of the Further Evaluation Recommended information associated with the Engineered Safety Features. NUREG-2191 and NUREG-2192 indicate which elements of the program need to be evaluated by the NRC reviewer. This section provides the plant-specific information required for this evaluation.
- The conclusion contains a conclusion statement regarding the ability of the selected AMPs to manage the effects of aging on the SCs that are subject to AMR for the Engineered Safety Features.
- A list of references is provided.

3.3 Aging Management of Auxiliary Systems

Guidance:

This subsection is further broken into four subsections.
- The introduction provides the road map for the remainder of Subsection 3.3. It lists the section of the SLRA where the Auxiliary Systems SSCs are identified (including a hyperlink). It also lists the systems, or portions of systems, that are addressed in this subsection. Finally, it contains Table 3.3.1, which presents the subsystem information, correlated to the data from Volume 1 of NUREG-2191.
- The results contain tables that summarize the AMRs for the systems. This subsection also contains a summary of the materials, environments, AERMs and AMPs for each subsystem within the Auxiliary Systems. Finally, it includes all of the Further Evaluation Recommended information associated with the Auxiliary Systems. NUREG-2191 and NUREG-2192 indicate which elements of the program need to be evaluated by the NRC reviewer. This section provides the plant-specific information required for this evaluation.
- The conclusion contains a conclusion statement regarding the ability of the selected AMPs to manage the effects of aging on the SCs that are subject to AMR for the Auxiliary Systems.
- A list of references is provided.

3.4 Aging Management of Steam and Power Conversion Systems

Guidance:

This subsection is further broken into four subsections.

- The introduction provides the road map for the remainder of Subsection 3.4. It lists the section of the SLRA where the Steam and Power Conversion Systems SSCs are identified (including a hyperlink). It also lists the systems, or portions of systems, that are addressed in this subsection. Finally, it contains Table 3.4.1, which presents the subsystem information, correlated to the data from Volume 1 of NUREG-2191.
- The results contain tables that summarize the AMRs for the systems. This subsection also contains a summary of the materials, environments, AERMS and AMPs for each subsystem within the Steam and Power Conversion Systems. Finally, it includes all of the Further Evaluation Recommended information associated with the Steam and Power Conversion Systems. NUREG-2191 and NUREG-2192 indicate which elements of the program need to be evaluated by the NRC reviewer. This section provides the plant-specific information required for this evaluation.
- The conclusion contains a conclusion statement regarding the ability of the selected AMPs to manage the effects of aging on the SCs that are subject to AMR for the Steam and Power Conversion Systems.

3.5 Aging Management of Containments, Structures and Component Supports

Guidance:

This subsection is further broken into four subsections.

- The introduction provides the road map for the remainder of Subsection 3.5. It lists the section of the SLRA where the Containments, Structures and Component Supports SSCs are identified (including a hyperlink). It also lists the structures or portions of structures that are addressed in this subsection. Finally, it contains Table 3.5.1, which presents the structure information, correlated to the data from Volume 1 of NUREG-2191.
- The results contain tables that summarize the AMRs for the systems. This subsection also contains a summary of the materials, environments, AERMs and AMPs for each subsystem within the Containments, Structures and Component Supports. Finally, it includes all of the Further Evaluation Recommended information NUREG-2191 and NUREG-2192 indicate which elements of the program need to be evaluated by the NRC reviewer. This section provides the plant-specific information required for this evaluation.
- The conclusion contains a conclusion statement regarding the ability of the selected AMPs to manage the effects of aging on the SCs that are subject to AMR for the Containments, Structures and Component Supports.
- A list of references is provided.

3.6 Aging Management of Electrical and Instrumentation and Controls

Guidance:

This subsection is further broken into four subsections.

- The introduction provides the road map for the remainder of Subsection 3.6. It lists the section of the SLRA where the Electrical and Instrumentation and Controls SCs are identified (including a hyperlink). It also lists the component types that are addressed in this

subsection. Finally, it contains Table 3.6.1, which presents the component type information, correlated to the data from Volume 1 of NUREG-2191.The results contain tables that summarize the AMRs for the component types. This subsection also contains a summary of the materials, environments, AERMs and AMPs for each component type within the Electrical and Instrumentation and Controls. Finally, it includes all of the Further Evaluation Recommended information associated with the Electrical and Instrumentation and Controls. NUREG-2191 and NUREG-2192 indicate which elements of the program need to be evaluated by the NRC reviewer. This section provides the plant-specific information required for this evaluation.

- The conclusion contains a conclusion statement regarding the ability of the selected AMPs to manage the effects of aging on the SCs that are subject to AMR for the Electrical and Instrumentation and Controls.
- A list of references is provided

4. TLAAs

Guidance:

- Empty heading or, at most, it could be a one-paragraph introduction for the section. NUREG-2192 will not provide a section to review this information.
- Not all of the TLAAs identified below will apply to all licensees. If a TLAA listed below is not applicable, the applicant need only state that it does not apply. It is not necessary to justify why it does not apply.

4.1 Identification of TLAAs

Guidance:

- The application shall include a list of TLAAs, as defined by §54.3. The SLRA should include the identification of the affected SSCs, 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 TLAA review, which may be provided in tabular form, may reference the section in the IPA - AMR chapter where more details of the actual review and disposition (as required by §54.21(c)(1)(i)-(iii)) are located.
- 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 [§54.29(a)]) projected to the end of the SPEO; or (3) the effects of aging on the intended function(s) will be adequately managed for the SPEO.
- 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 SPEO.
- Summary descriptions of the evaluations of TLAAs for the SPEO shall be included in the UFSAR supplement (Appendix A).

4.2 Reactor Vessel Neutron Embrittlement

Guidance:

- Disposition chosen for each of the identified TLAAs. Also, provide a reference to the

summary description of TLAA evaluations in the UFSAR 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)].

4.3 Metal Fatigue

Guidance:

- Disposition chosen for each of the identified TLAAs. Also, provide a reference to the summary description of TLAA evaluations in the UFSAR 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)]

4.4 EQ of Electrical Equipment

Guidance:

- Disposition chosen for each of the identified TLAAs. Also, provide a reference to the summary description of TLAA evaluations in the UFSAR 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)].

4.5 Concrete Containment Tendon Prestress

Guidance:

- Disposition chosen for each of the identified TLAAs. Also, provide a reference to the summary description of TLAA evaluations in the UFSAR 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)].

4.6 Containment Liner Plate, Metal Containments, and Penetrations Fatigue Analysis

Guidance:

- Disposition chosen for each of the identified TLAAs. Also, provide a reference to the summary description of TLAA evaluations in the UFSAR 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)].

4.7 Other Plant-Specific TLAAs

Guidance:

- Identify and evaluate any plant-specific TLAAs.

APPENDIX A: U FSAR SUPPLEMENT

Guidance:

- The contents of the UFSAR supplement will be based on the technical information provided in the application. Section 54.21(d) of the Rule requires a summary description of the programs and activities for managing the effects of aging for the SPEO as determined by the IPA review. A summary description of the evaluation of TLAAs for the SPEO must also be included in the UFSAR supplement.
- Guidance contained in NUREG-2191, Tables X-01 and XI-01, NEI 98-03, "Guidelines for Updating Final Safety Analysis Reports," and NEI 96-07, "Guidelines for 10 CFR

Evaluations," should be considered in the preparation of the UFSAR supplement.

- In some instances, summary descriptions of programs and activities already exist in the plant UFSAR. The applicant may choose to incorporate these existing pages of the UFSAR by reference or may choose to include them in the SLRA.
- The process to review and approve this change to the plant UFSAR should be the same as that which the applicant presently utilizes.
- A table of commitments shall be included that identifies: 1) each new AMP/activity to be credited for aging management, 2) each credited existing AMP/activity that requires enhancement, 3) each credited activity that will not be completed until after the issuance of the renewed license, and 4) the projected completion date for each commitment.
- Once the renewed license is issued, the material contained in this Appendix A is to be incorporated into the UFSAR.

APPENDIX B: AMPs AND ACTIVITIES

Guidance:

Lists and describes the AMPs and activities referenced in Section 3. Most applicants will find it beneficial to credit many of NUREG-2191 evaluations of AMPs. NUREG-2191 provides one way to manage AERMs. Other programs may be demonstrated to be adequate. A cross- reference should be provided of the plant's program names to applicable NUREG-2191, Section X and XI program names. An alphabetical list, as well as a list by NUREG-2191 program numbers, should be provided.

- Appendix B of the SLRA consists of the following four subsections:
  1. The introduction provides an overview of Appendix B and provides general information to be used by the reviewer while navigating through Appendix B. It contains the following subsections: overview, method of discussion, quality assurance and administrative controls, OE, and AMPs.
  2. The AMPs section contains a table that identifies the sample plant AMPs, along with the corresponding NUREG-2191 program number and name. The programs are listed in the program order of NUREG-2191. The programs that are consistent with NUREG-2191, or are consistent with exceptions, are listed first, followed by the plant-specific programs.
  3. The section for evaluation of AMPs required by §54.21(c)(1)(iii) addresses programs credited in the evaluation of TLAAs.
  4. A list of references is provided.
- AMP descriptions shall address plant-specific OE about the performance and effectiveness of the AMPs during subsequent PEO, or the previous LRA OE cutoff date. Guidelines for the bases of these discussions are provided in NUREG-2192, Appendix A.4, Operating Experience for Aging Management Programs, and NEI 14-12, Aging Management Program Effectiveness. See NEI 17-01, Appendix B, Section 6, "Appendix B of the SLRA – Aging Management Programs (AMPs)," for additional guidance on enhancements to the OE discussions over what was contained in the previous LRA submittals.

APPENDIX C: (OPTIONAL)

Guidance:

- An applicant may use this appendix for any plant-specific information felt to be required for the application that does not fit well anywhere else.

APPENDIX D: TECHNICAL SPECIFICATION CHANGES

Guidance:

- Appendix D includes appropriate technical specification changes prepared and presented in a manner consistent with the way the applicant normally submits proposed technical specification revisions. Justification may be included herein, or may reference other parts of the SLRA. Appendix D meets the requirements of §54.22.
- Once the renewed license is issued, the proposed changes to technical specifications will be incorporated and issued along with the renewed license. The technical specifications are in a living document and should be maintained in accordance with applicable regulations and plant procedures.

APPENDIX E: ENVIRONMENTAL INFORMATION

Guidance:

- 10 CFR 51.53(c) requires a renewal applicant to address certain environmental impacts in a supplement to the plant's ER. This supplement is provided as Appendix E to the SLRA.
- The format and content of Appendix E should be based on Supplement 1 to Regulatory Guide 4.2, Preparation of Supplemental Environmental Reports for Applications to Renew Nuclear Power Plant Operating Licenses.
- Once the renewed license is issued, the environmental information contained in Appendix E will be maintained in accordance with applicable regulations and plant procedures.

7 POST-SLRA SUBMITTAL ACTIVITIES

Post-SLRA submittal activities include update of the SLRA information for CLB changes, SLRA appeals and post-renewal UFSAR updates for newly identified SSCs.

7.1 UPDATE OF THE SLRA FOR CLB CHANGES

Part 54 Reference

§54.21(b)

CLB changes during NRC review of application. Each year following submittal of the license renewal application and at least 3 months before scheduled completion of the NRC review, an amendment to the renewal application must be submitted that identifies any change to the CLB of the facility that materially affects the contents of the license renewal application, including the FSAR supplement.

The Rule requires that the SLRA, including the UFSAR supplement, be updated yearly, and at least three months before scheduled completion of the NRC review, to identify any changes to the facility's CLB that materially affect the application. These changes are provided to the NRC in the form of an amendment to the SLRA. A CLB change materially affects the contents of the SLRA when including information about how the change in the amendment would reasonably be expected to cause the NRC to come to a different conclusion about the subject of the change, than if the information were not included.

The amendment to the SLRA, submitted at least three months before the scheduled completion of the NRC review, should include a list of "high level future commitments" as described in Reference 15. The list should be contained in an update to the UFSAR supplement.

The due date for the annual update and the update submitted at least three months before the scheduled completion of the NRC review may occur close together chronologically. The applicant may desire discussing the need for two updates with the NRC. In Reference 14, the NRC set the precedent of requiring only one update in these circumstances. The scheduled completion of the NRC review is the date on the NRC application review schedule that the safety evaluation is due.

7.2 SLRA APPEALS

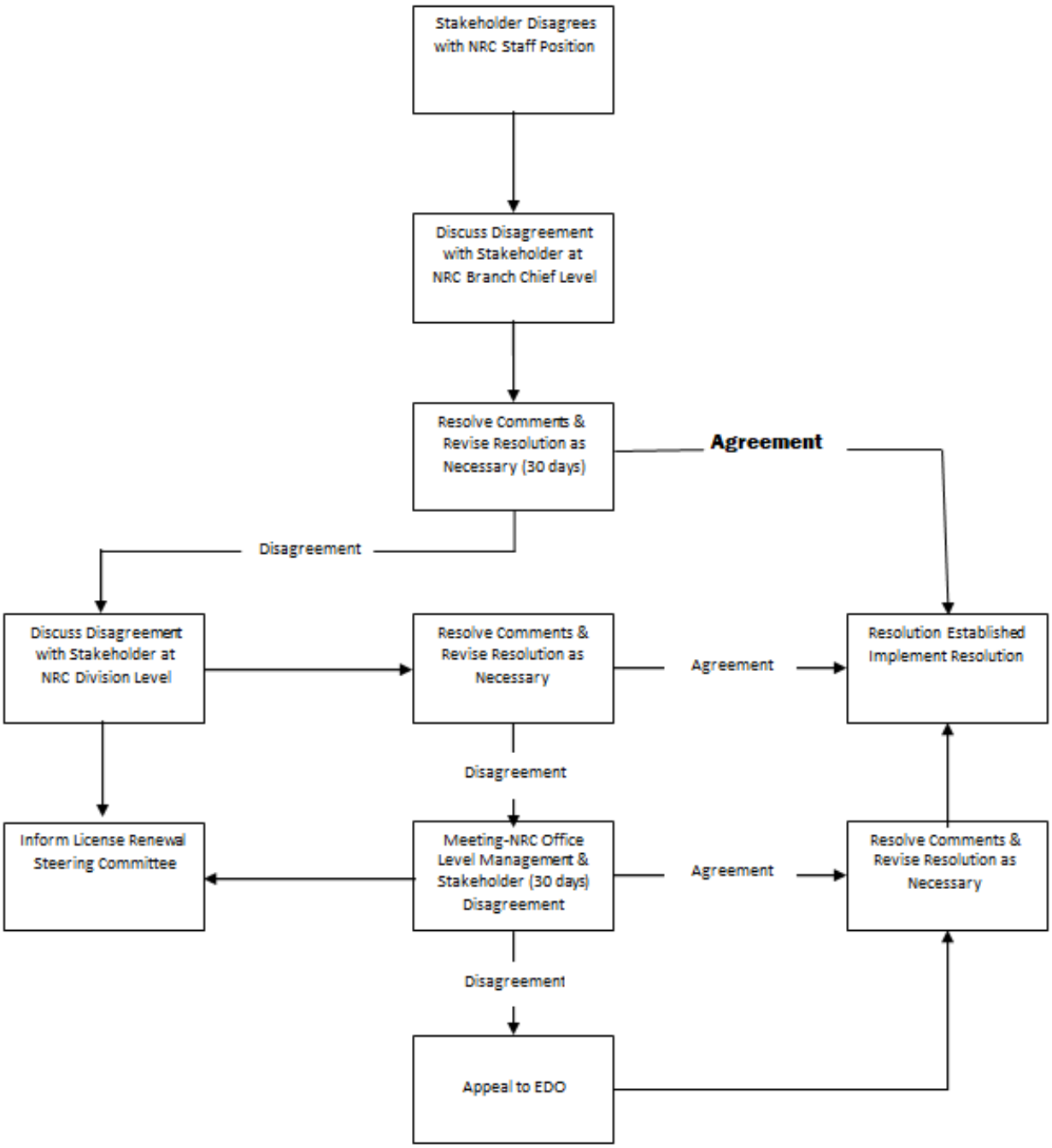
During review of the SLRA, any applicant can initiate a formal appeal by a written request to the Director, Division of Materials and License Renewal, who will serve as the first-level decision maker in the appeals process. If either party in this first-level appeal wishes to appeal to the division level, such party should submit a written request to the Director, Office of Nuclear Reactor Regulation, who will serve as the second-level decision maker. A further appeal can be initiated by a written request to the Deputy Executive Director, Reactor and Preparedness

Programs, who will serve as the third- level decision maker. The next level of appeal can be initiated by a written request to the Executive Director, Operations, who would serve as the fourth-level decision maker.

The issue being appealed should be clearly defined by a written statement accompanying the request for appeal. The issue statement should have a clearly defined scope and should reference the applicable section(s) of the regulation that provides the requirements for the issue being appealed. Upon receipt of the request for appeal, the Director, Division of Materials and License Renewal will forward the request to the relevant staff who will review the request and agree that the appeal originator has clearly identified the issue. The Director, Division of Materials and License Renewal will then determine whether the issue is admissible or subject to appeal (i.e., the issue has not previously been decided on appeal). The Director, Division of Materials and License Renewal will provide a written response to the originator, acknowledging receipt of the request, along with the determination of admissibility, and identification of an appeal coordinator, who will provide administrative oversight and support during the appeal process. The determination by the Director, Division of Materials and License Renewal regarding the admissibility of the request should include the basis for the determination.

See the License Renewal Appeals Process Flowchart, Figure 7.2-1.

Figure 7.2-1: License Renewal Appeals Process



7.3 POST-SLR NEWLY IDENTIFIED SSCS

Part 54 Reference

§54.37(b)

After the renewed license is issued, the FSAR update required by 10 CFR 50.71(e) must include any systems, structures, and components newly identified that would have been subject to an aging management review or evaluation of time-limited aging analyses in accordance with 54.21. This FSAR update must describe how the effects of aging will be managed such that the intended function(s) in 54.4(b) will be effectively maintained during the period of extended operation.

After the renewed license is granted, changes may occur to the plant's design and licensing basis. Newly identified SSCs that would have been subject to AMR must be evaluated to determine whether there are AERMs.

The NRC issued Regulatory Issue Summary 2007-16, Revision 1, Implementation of the Requirements of 10 CFR 54.37(b) for Holders of Renewed Licenses, on April 28, 2010. RIS 2007-16 provides guidance to holders of renewed licenses on implementing the requirements of 10 CFRE 54.37(b), regarding newly identified SSCs and information to be included in FSAR updates.

The intent of 10 CFR 54.37(b) is to capture those SSCs that, if they had been identified at the time of the license renewal application, would have been subject to an aging management review or evaluation of TLAAs. In the context of 10 CFR 54.37(b), newly identified SSCs that should be included in the next FSAR update required by 10 CFR 50.71(e) are those SSCs that meet one of the two following conditions:

(1) There is a change to the current licensing basis (CLB) that meets the following criteria:

– The change impacts SSCs that were not in scope for license renewal when the NRC approved the license renewal application.

– The SSCs would have been in the scope of license renewal based on the CLB change if 10 CFR 54.4(a) were applied to the SSCs.

(2) SSCs were installed in the plant at the time of the license renewal review that, in accordance with the CLB at the time, should have been included in the scope of license renewal per 10 CFR 54.4(a) but were not identified as in scope until after issuance of the renewed license.

SSCs that are plant additions or modifications installed after the renewed license is issued are not subject to the provisions of 10 CFR 54.37(b).

If SCs that are considered to not be long-lived in the SLRA are later removed from a replacement program, then the aging effects associated with these SC's must be managed and the

requirements of 54.37(b) become applicable.

The UFSAR update required by 10 CFR 50.71(e) may need to include a description of the SSCs and a description of how the effects of aging will be managed. The description of how the effects of aging are managed can be a reference to an existing AMP already described in the UFSAR, a description of an existing AMP not previously credited for SLR, or a description of a new AMP. The descriptions should be to the same level of detail as exists in the UFSAR.

If the licensee identifies existing calculations that would have been TLAAs, then the licensee must evaluate these calculations to determine how the requirements of 54.21(c) will be met. The demonstration required by 54.21(c) may be done using any of the three options provided by 54.21(c)(1) (i), (ii) or (iii).

If TLAAs are identified for inclusion in the UFSAR update required by 10 CFR 50.71(e), then the UFSAR update must include a summary description of the evaluation of the TLAA to the same level of detail as exists in the UFSAR.

The implementation of this requirement may be accomplished by addition to existing processes for configuration management or it may be accomplished by implementation of new processes specifically to implement the requirements of 10 CFR 54.37(b). NRC inspection for compliance with this requirement is performed in accordance with NRC Inspection Procedure 71003.

APPENDIX A
REFERENCES

Appendix A

References

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- Reference 11: "GENERIC SAFETY ISSUES RELATED TO LICENSE RENEWAL (TAC NO. M92972)," Letter to Douglas J. Walters, Nuclear Energy Institute, from Christopher I. Grimes, NRC, dated January 29, 1998 [See NEI 95-10, Rev. 6, Appendix C, Reference 11]

- Reference 12: "LICENSE RENEWAL ISSUE NO. 98-0082, SCOPING GUIDANCE," Letter to Douglas J. Walters, Nuclear Energy Institute, from Christopher I. Grimes, NRC, dated August 5, 1999 [See NEI 95-10, Rev. 6, Appendix C, Reference 12]

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- Reference 34: NUREG-2191, Volume 2, Rev. 0, "GENERIC AGING LESSONS LEARNED FOR SUBSEQUENT LICENSE RENEWAL (GALL-SLR) REPORT," dated July 2017 [ADAMS Accession No. ML17xxxAxxx]

- Reference 35: NUREG-2192, "STANDARD REVIEW PLAN FOR REVIEW OF SUBSEQUENT LICENSE RENEWAL APPLICATIONS FOR NUCLEAR POWER PLANTS," dated July 2017 [ADAMS Accession No. ML17xxxAxxx]

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APPENDIX B STANDARD SLRA FORMAT AND CONTENT

OVERVIEW

In July of 2002, a group of utility members formed a Standard License Renewal Application (LRA) project team, under the coordination of the Nuclear Energy Institute's (NEI's) License Renewal Task Force (LRTF). The team met periodically with NRC staff throughout the remainder of that year. Based on that collaborative and iterative effort between NEI and the NRC, a standardized LRA format was agreed upon which both the industry and the NRC believed contained the right amount of information, presented in the best way possible, to gain the maximum efficiency possible from the data presentation within the LRA to facilitate the NRC's review.

That standardized format for initial LRAs was subsequently documented in NEI 95-10, Rev. 6, which was published in June of 2005 and was then endorsed by the NRC. Since then, the industry has successfully submitted approximately 33 LRAs, representing 48 operating units, for review by the NRC. All (GALL Plants) of those LRAs were based on the guidance in NEI 95-10, Rev. 6, and were accepted for review by the NRC.

Over the period of time since the issuance of NEI 95-10, Rev. 6, there has been further evolution of the content of LRAs. The content expansion that occurred was the result of NRC RAIs generated during their LRA reviews and on comments made by the NRC directly to the industry through its regularly scheduled public meetings with NEI's LRTF. Throughout this evolution, however, the format of the LRA has remained the same.

For that reason, the same format is being continued for SLRAs. Even though the format is not changing, there are changes required to the content of SLRAs. The reasons for the content changes are twofold.

The first reason is the use of the new SLR Generic Aging Lessons Learned (GALL) Report (NUREG-2191) and SLR Standard Review Plan (SRP) (NUREG-2192) for SLRA preparation guidance. These guidance documents replace the initial GALL Report (NUREG-1801) and SRP (NUREG-1800), respectively, for SLR; however, Rev. 2 of NUREG-1800 and NUREG-1801 will continue to be used for the few remaining initial LRA submittals, as well as NEI 95-10, Rev.6. Additionally, for SLR, the NRC will be updating Regulatory Guide 1.188, Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses.

The second reason for content change within SLRAs is the enhancement of Aging Management Program (AMP) descriptions by the applicant to address the effectiveness of each AMP credited in the plant's initial LRA since the entry of the plant into its initial period of extended operation (PEO). Specific plant operating experience (OE) under each AMP that was credited in the initial LRA, from the plant's time of entry into its first PEO, is to be addressed in the SLRA as identified in the main body of this document and in this appendix. New AMPs credited in a plant's SLRA for the first time are to be documented in the same fashion as those in the plant's initial LRA.

Based on the above, relative to the standard format and content for a SLRA, instead of trying to capture that in this appendix in the manner that was done for NEI 95-10, Rev. 6, there is a better, more consistent and sustainable approach. The best approach to now use for the preparation of any new application is to utilize the last few applications submitted to the NRC as models. The

SLRAs have the latest format and industry expectations for application content. The NRC verifies that is the case through its sufficiency review before commencing its formal technical review of an application. The NRC's LR website contains an electronic copy of every application that has been submitted for NRC review; so, the latest accepted submissions are readily available. The web address for that access is:

http://www.nrc.gov/reactors/operating/licensing/renewal/applications.html

For the first couple of SLRAs that will be submitted, there will be no SLRAs on the above website to use as models for SLRA preparation. For that reason, this appendix to NEI 17-01 contains guidance for the parts of the SLRA that will require different content than an initial LRA and what that additional content should include. Until such time that SLRAs are submitted and posted to the NRC website, the latest several initial LRA submittals can still be used as models for the format and content of an SLRA in conjunction with the information that is presented in the balance of this appendix.

During the preparation of the SLRA, it is important to utilize NUREG-2192, the SRP-SLR, to identify the SLRA content and its technical details that the NRC staff will be looking for during their review. The licensee should be ready to address any differences between what is in its SLRA and what the NRC is expecting to see, based on the review criteria throughout NUREG-2192. Additionally, once the SLRA is completed, it should be reviewed against Section 1.0, Table 1.1-1, "Acceptance Review Checklist for Subsequent License Renewal Application Acceptability for Docketing," in particular, to ensure that the SLRA will pass the NRC's sufficiency review for acceptability of the SLRA to be docketed before its detailed NRC review can begin.

Appendix B Contents

This Appendix contains SLRA specific format and content discussion for each of the following items:

1. Section 1.0 of the SLRA – Administrative Information
2. Section 2.0 of the SLRA – Scoping and Screening
3. Section 3.0 of the SLRA – AMRs
4. Section 4.0 of the SLRA – TLAAs
5. Appendix A of the SLRA – UFSAR LR Supplement
6. Appendix B of the SLRA – Aging Management Programs (AMPs)
7. Appendix C of the SLRA – Licensee Specific Activities Relative to RVI
8. Appendix D of the SLRA – Technical Specifications

1 Section 1.0 of the SLRA – Administrative Information

For SLRAs, the format and content of this section should be consistent with what is in the latest LRA submittals that are located on the NRC's website. Those LRAs should be used as the bases for format and content for SLRA Section 1.0 until such time that SLRA submittals have been posted to the site. The specific format for this section of the most recent LRAs is not standardized as it is for Sections 2.0, 3.0, and 4.0; however, the content generally is standardized. For many SLRAs, the changes to this section from the initial LRA will just be to update the information that was contained there. For licensees that had earlier initial LRA submittals, in addition to the update of the equivalent information in that LRA, that content may need to be placed in a format more similar to those utilized in the latest LRA submittals.

2 Section 2.0 of the SLRA – Scoping and Screening

The content of Section 2.0 of the SLRA consists of the following:

2.0 SCOPING AND SCREENING METHODOLOGY FOR IDENTIFYING STRUCTURES AND COMPONENTS SUBJECT TO AGING MANAGEMENT REVIEW AND IMPLEMENTATION RESULTS

2.1 Scoping and Screening Methodology

2.2 Plant Level Scoping Results

2.3 Scoping and Screening Results: Mechanical Systems

2.4 Scoping and Screening Results: Structures

2.5 Scoping and Screening Results: Electrical and Instrumentation and Control Systems

For SLRAs, the format and content of these sections will remain as they have been presented in the latest LRAs that are on the NRC's website as of the publication of this document. Those LRAs should be used as guidance for preparation of Section 2.0 of the SLRA until such time that SLRAs that have been submitted for review are posted as well. Further, the licensee must be sure that the content of SLRA Section 2.0 and its subsections meets the content expectations that are identified in the equivalent section/subsections of NUREG-2192, the SRP-SLR.

Most of the content of the licensee's initial LRA, and the scoping and screening documentation that support it, can be utilized to help with the preparation of the SLRA and its supporting documentation. The most significant change for SLRA Section 2.0 preparation, particularly for licensees that had earlier initial LRA submittals, may be meeting the current format and content expectations.

Because of the ongoing effort by each licensee to meet the requirements of §54.37(b) from the initial LRA, determinations of additions to SLR scope beyond what was already in the initial LRA scope may be easier. This is the case since licensees are reporting the discovery of "newly identified" components in their §54.37(b) evaluation supporting documentation.

3 Section 3.0 of the SLRA – AMRs

The content of Section 3.0 of the SLRA, consists of the following:

3.0 AGING MANAGEMENT REVIEW RESULTS

3.1 Reactor Vessel, Internals, and Reactor Coolant System

3.2 Engineered Safety Features

3.3 Auxiliary Systems

3.4 Steam and Power Conversion

3.5 Containments, Structures, and Component Supports

3.6 Electrical and Instrumentation and Controls

For SLRA preparation, the format of these sections will remain as they have been presented in the latest LRAs that are on the NRC's website as of the publication of this document. The significant change that occurs for Section 3.0 in the SLRAs is that the Table 3.X.1 and 3.X.2.Y[3] aging management tables will no longer be based on NUREG-1801(the GALL Report), as is the case for the latest LRAs that are on the NRC's website as of the publication of this document. Those tables must now be based on NUREG-2191, (GALL-SLR Report). The 3.X.1 and 3.X.2.Y tables in the LRAs, and how they are cross referenced to NUREG-1801, are to be used as the model for providing the same cross reference of the equivalent SLRA 3.X.1 and 3.X.2.Y tables with NUREG-2191.

Until such time that submitted SLRAs become available on the NRC's website, the latest submitted LRAs currently posted should be used as guidance for generating the format and content of Section 3.0 of the SLRA and its subsections, with the incorporation of the significant difference identified in the previous paragraph.

As identified for SLRA Section 2.0, the licensee must be sure that the content of SLRA Section 3.0 and its subsections meets the content expectations that are identified in the equivalent section/subsections of NUREG-2192, the SRP-SLR.

As for scoping and screening, most of the work performed for AMR in support of preparation of the licensee's initial LRA will be able to be used for the SLRA. In particular, very little of the effort expended for determining SSC materials and environments will change for SLR. Any components that are added to the SLRA scope beyond what was in the initial LRA scope will have to go through the same detailed AMR and included in the SLR AMR supporting documentation and SLRA.

[3] Where 3.X corresponds to the applicable Section 3.0 subsection from above and Y corresponds to the unique subsection identifier being utilized for each of the individual systems or structures being addressed under that Section 3.0 subsection.

Depending on when the licensee's initial LRA was submitted, the task is to present the plant's component/material/environment combination AMR results consistent with those that are now in NUREG-2191, in the format of the latest LRAs, and with the content that is expected in NUREG-2192. Since the initial LRA submittal in 1998, the evolution of the presentation of AMR results in the LRA have undergone the most significant of all changes that have occurred to LRA format and content.

4 Section 4.0 of the SLRA – TLAAs

The content of Section 4.0 of the SLRA consists of the following:

4.0 TIME LIMITED AGING ANALYSES

4.1 Identification of Time-Limited Aging Analyses

4.2 Reactor Vessel Neutron Embrittlement

4.3 Metal Fatigue

4.4 Environmental Qualification (EQ) of Electrical Equipment

4.5 Concrete Containment Tendon Prestress

4.6 Containment Liner Plate, Metal Containments, and Penetrations Fatigue Analysis

4.7 Other Plant Specific TLAAs

The TLAAs that were identified and analyzed for the licensee's initial LRA submittal, most likely, will not have changed since that time. They will now, however, have to be reanalyzed and dispositioned for another 20 years of operation for the SLRA. Any changes that may have occurred to those TLAAs will have to be adequately addressed in the SLRA.

It is also important to determine if there are any TLAAs that need to be added or deleted to that initial set. As a result of plant modifications or to changes in how plant components are being managed for aging subsequent to initial LR, new TLAAs could have been added or deleted. As an example of this, since initial LR approval for many plants, the nuclear industry has committed to the adoption of NEI 03-08, "Guidelines for the Management of Materials Issues." Adoption of the requirements under that document have changed the aging management of PWR vessel internals from what was initially committed to for many of the early PWR LR applicants. These changes may have resulted in the adoption of new TLAAs for some of those licensees.

As with the other sections of the SLRA that have been previously addressed, the latest LRAs on the NRC website need to be utilized as guidance for the format and content of Section 4.0 of the SLRA until such time that an SLRA has been submitted and posted. Other than the potential TLAA changes that have been addressed above, this section should not change much from what was in the licensee's initial LRA submittal. Again, it will be the TLAA sections from earlier LRA submittals that will require the most change to meet the current Section 4.0 format and content expectations. These licensees will have to organize the plant's TLAAs to fit under the standardized subsections shown above.

As emphasized for the other SLRA sections, Section 4.0 and its subsections must be generated utilizing the guidance from NUREG-2192, Section 4.0, and its equivalent subsections, to ensure that the SLRA content meets industry expectations.

5 Appendix A of the SLRA – UFSAR LR Supplement

Each SLR applicant will already have a LR Supplement in that plant's UFSAR. As a result of the generation of an SLRA and the changes that will be occurring to the CLB defined therein, a rewrite or addition to the existing LR Supplement will be required. Particularly for the licensees that received initial LR approvals earlier on, the licensee should review the format and content of the LR Supplements in the latest LRA submittals on the NRC website when addressing the UFSAR's SLR Supplement. Where there are differences, especially significant ones, between the plant's current supplement and what is in the latest SLRA submittals, consideration should be given to making the changes needed to make the SLR Supplements across the industry as consistent as possible.

This is helpful for two reasons. First, a SLR Supplement that is consistent with what the NRC Staff is familiar reviewing may result in the elimination of, or at least a significant reduction in, the receipt of NRC RAIs specific to the SLR Supplement during the NRC's review of the SLRA. Second, it helps to put industry plants on a more consistent renewed licensing basis which provides for better industry uniformity for SLR implementation and for improved consistency during the NRC's SLR-specific inspections as well as those under the NRC's Reactor Oversight Process (ROP) that now address SLR-credited aging management.

6 Appendix B of the SLRA – Aging Management Programs (AMPs)

As for the other LRA/SLRA Appendices, there is not a standardized format for this Appendix that has been defined. There is, however, a standardized approach for the information that is presented. The latest LRAs that are on the NRC's website should be used as guidance for the development of SLRA Appendix B until such time that SLRAs have been submitted and posted there.

For Appendix B of the SLRA, there are two areas that need to be enhanced over what is contained in those latest LRA submittals. Each is described in the paragraphs that follow.

There is an introduction section of this Appendix that typically: 1) provides an overview of the Appendix and its organization; 2) addresses the plant's QA Program and administrative controls, including the corrective action program, relative to their oversight of the credited AMPs; 3) addresses how OE is used to inform and enhance AMPs; 4) identifies the GALL-SLR AMP sections of the Appendix; and 5) identifies the plant specific AMP sections of the Appendix.

For the first of these enhancements, additional discussion is needed for the part of the introduction section that describes the use of OE to inform and enhance the plant's AMPs over the course of the initial PEO and the SPEO. This discussion needs to identify how the guidance in NEI 14-13, AMP OE; NEI 14-12, AMP Effectiveness; and NUREG-2192, Appendix A.4,

Operating Experience for AMPs, have been implemented and applied at the plant. For the rest of the introduction section, the discussions should be consistent with what is in the latest LRAs on the NRC's website.

In the SLRA, as in the latest LRAs on the NRC's website, the rest of Appendix B needs to address the AMPs that have been credited for aging management during the SPEO. Most of those AMPs will have already been implemented for the initial PEO in the initial LRA. Of those AMPs, most of them are GALL AMPs (for GALL plants) with the remainder being plant specific AMPs. The SLRA Appendix B discussion for each of those AMPs needs to be consistent with the format and content in the latest LRAs for each of those two types of AMPs.

For the second of the two enhancements, in each of those two AMP type discussions, there is a subsection relative to OE that is specific to the applicable AMP. Compared to those specific OE discussions in the latest submitted LRAs, additional SLRA discussion is needed to describe: 1) any significant plant OE that has been identified as a result of the performance of the program's credited activities; 2) any significant plant OE that has occurred and was not identified by the performance of the program's credited activities; 3)how any of that OE has been used to inform and enhance the AMP; 4) any industry OE external to the plant that has been used to enhance the AMP; and 5) how the effectiveness of the AMP is being monitored and gauged at the plant. The discussion of significant plant OE should include any instances where plant OE identified degradation that was determined to be a failure or degradation that was not a failure, but indicates that aging is occurring that was not expected. This discussion should include corrective actions and changes to AMPs as a result of the degradation.

The OE section should also include a discussion of the effectiveness of AMPs that were credited for the original license renewal application as described in NEI 14-12 and how NEI 14-13 was effectively reviewing OE to improve AMPs. This discussion should include both AMP results that showed that aging was being managed or that changes to the AMP were needed to effectively manage aging to maintain the intended functions of the structures and components. The discussion of effectiveness of the AMPs should demonstrate how the plant has implemented the guidance in NUREG 14-12, NEI 14-13, and NUREG-2192, Appendix A.4 to ensure the effectiveness of each AMP that has been in place during the initial PEO.

7 Appendix C of the SLRA – Licensee Specific Activities Relative to RVI

This Appendix to the latest LRAs, that will continue to be used for SLRAs, addresses plant specific activities, identified in the BWRVIP for BWRs and in MRP-227 for PWRs, for aging management of RVI or Licensee Action Items (LAIs). In this Appendix, the SLRA will have to address each of those BWR or PWR licensee specific activities as applicable to the licensee's plant. Until there are SLRAs submitted and posted on the NRC's website, the format and content of this Appendix in the latest LRAs on the NRC website, specific to the applicant's plant type, should be used as guidance during the generation of this Appendix to the SLRA.

8 Appendix D of the SLRA – Technical Specifications

This section of the SLRA would be used to identify and justify any Technical Specification (TS) changes that may be required as a result of credited SLR activities. Such SLR-specific TS changes have very rarely occurred; therefore, so the NRC understands that it has been considered, this Appendix is typically included with the explanation that no such changes have occurred.