

**NEI 95-10 (REVISION 0)  
INDUSTRY GUIDELINE FOR IMPLEMENTING  
THE REQUIREMENTS OF 10 CFR PART 54 -  
THE LICENSE RENEWAL RULE**



NUCLEAR  
ENERGY  
INSTITUTE

**MARCH 1996**

7605080054 760504  
NIP PROJ  
7/95 FDB

**NEI 95-10 (REVISION 0)**

**NUCLEAR ENERGY INSTITUTE**

**INDUSTRY GUIDELINE FOR IMPLEMENTING THE  
REQUIREMENTS OF 10 CFR PART 50 –  
THE LICENSE RENEWAL RULE**

## **INDUSTRY GUIDELINE FOR IMPLEMENTING THE LICENSE RENEWAL RULE**

	<b>TABLE OF CONTENTS</b>	<b>PAGE NO.</b>
1.0	Introduction	1
1.1	Background	1
1.2	Purpose and Scope	1
1.3	Applicability	2
1.4	Utilization of Existing Programs	2
1.5	Resolution of Current Safety Issues	3
1.6	Organization of the Guideline	3
2.0	Overview of Part 54	5
3.0	Identify The SSCs Within The Scope Of License Renewal And Their Intended Functions	8
3.1	Systems, Structures, and Components Within the Scope of License Renewal	8
3.2	Intended Functions of SSCs Within the Scope of License Renewal	14
3.3	Documenting The Scoping Process	16
4.0	Integrated Plant Assessment	17
4.1	Identification of Structures and Components Subject to an Aging Management Review and Intended Functions	18
4.2	Aging Management Reviews	25
4.3	Application of Inspections for License Renewal	38
4.4	Documenting The Integrated Plant Assessment	40
5.0	Time-Limited Aging Analyses Including Exemptions	42
5.1	Time-Limited Aging Analyses	42
5.2	Exemptions	49
5.3	Documenting the Evaluation of the Time-Limited Aging Analyses and Exemptions	50
6.0	Renewal Operating License Application Format and Content	51
6.1	Formal Application	53
6.2	Exhibit A - Technical Information	54
6.3	Exhibit B - FSAR Supplement	58
6.4	Exhibit C - Technical Specifications	59
6.5	Exhibit D - Environmental Information	60
Appendix A	10 CFR Part 54	A-1
Appendix B	Typical Structure And Component Groupings And Active/Passive Determinations For The Integrated Plant Assessment	B-1
Appendix C	Examples to Demonstrate the License Renewal Process	C-1

LIST OF TABLES

<u>TABLE NO.</u>	<u>TITLE</u>	<u>PAGE NO.</u>
3.1-1	SAMPLE LISTING OF POTENTIAL INFORMATION SOURCES	13
4.1-1	TYPICAL PASSIVE STRUCTURE AND COMPONENT INTENDED FUNCTIONS	22
5.1-1	DISPOSITION OF POTENTIAL TLAA <sub>s</sub> AND BASIS FOR DISPOSITION	47
5.1-2	POTENTIAL TLAA <sub>s</sub>	48
6.0-1	SAMPLE APPLICATION FORMAT	52

LIST OF FIGURES

<u>FIGURE NO.</u>	<u>TITLE</u>	<u>PAGE NO.</u>
2.0-1	LICENSE RENEWAL IMPLEMENTATION PROCESS	7
3.0-1	A METHOD TO IDENTIFY SSCs AND INTENDED FUNCTIONS WITHIN THE SCOPE OF LICENSE RENEWAL [§54.4(a) & (b)]	9
4.1-1	IDENTIFICATION OF STRUCTURES AND COMPONENTS SUBJECT TO AGING MANAGEMENT REVIEW [§54.21(a)(1)]	20
4.2-1	ASSURING THAT THE EFFECTS OF AGING WILL BE MANAGED [§54.21(a)(3)]	26
4.2-2	ASSURING THAT THE EFFECTS OF AGING WILL BE MANAGED [§54.21(a)(3)] USING A PREVIOUS REVIEW	33
4.2-3	ASSURING THAT THE EFFECTS OF AGING WILL BE MANAGED [§54.21(a)(3)] USING A MONITORING PROGRAM	35
5.0-1	EVALUATION OF TLAAs AND EXEMPTIONS [§54.21(c)]	43
C.1-1	PWR ONCE-THROUGH COOLING SYSTEM	C - 5

## **GUIDELINE TO IMPLEMENT 10 CFR PART 54 THE LICENSE RENEWAL RULE**

### **1.0 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. The process outlined in this guideline is founded on industry experience and expertise in implementing the license renewal rule. 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 license renewal application.

This guideline uses terminology specific to the license renewal rule. A copy of 10 CFR Part 54 is provided as Appendix A 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, and existing plant programs.

### **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 the Rule (Section 3.1);
- Identifying the intended functions of systems, structures, and components within the scope of the Rule (Section 3.2);
- Identifying the structures and components subject to aging management review (Section 4.1);
- Assuring that effects of aging are managed (Section 4.2);
- Application of inspections for license renewal (Section 4.3);
- Identifying and resolving time-limited aging analyses (Section 5.1);
- Identifying and evaluating exemptions containing time-limited aging analyses (Section 5.2); and
- Identifying a suggested format and content of a license renewal application (Section 6.0).

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

### 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 Existing Programs

This guideline is intended to maximize the use of existing industry programs, studies, initiatives and databases. Most utilities interested in renewing their operating license will prepare their license renewal application after the effective date of the maintenance rule (10 CFR 50.65), which is July 10, 1996. This guideline is written with the knowledge that some provisions of the license renewal rule may be satisfied with actions taken to comply with 10 CFR 50.65. Because of similarities between the two rules, implementation guidance for the maintenance rule<sup>1</sup> should be reviewed to determine if it can be found acceptable/credited for meeting the license renewal rule requirements. For example, the initial scoping of safety-related systems, structures, and components (SSCs) for license renewal is identical to the scoping of safety-related systems, structures, and components required by the maintenance rule. The license renewal scoping of nonsafety-related systems, structures, and components that support safety-related systems, structures, and components is similar to the maintenance rule. Applicants are cautioned, however, that there are differences. For instance, the maintenance rule excludes nonsafety-related systems, structures, and components based solely on seismic II/I interactions. This is not an exclusion under the license renewal rule.

The process used to determine the systems, structures, and components within the scope of the maintenance rule may have also identified the system, structure, and component functions necessary for license renewal implementation. In addition, many of the programs used for establishing performance criteria at the plant, system, or train level to meet the intent of the maintenance rule may be key elements of the license renewal aging management review process. Applicants are encouraged to carefully review and evaluate their maintenance rule documentation for applicability and ease of use in preparing a license renewal application.

---

<sup>1</sup> NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," to the extent endorsed by the NRC in Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants."

**1.5 Resolution of Current Safety Issues (e.g., GSIs and USIs)**

Generic resolution of a generic safety issue (GSI) or unresolved safety issue (USI) is not necessary for the issuance of a renewed license. GSIs and USIs that do not contain issues related to the license renewal aging management review or time-limited aging evaluation need not be reviewed. However, designation of an issue as a GSI or USI does not exclude the issue from the scope of the aging management review or time-limited aging evaluation. (The current process for resolution of GSIs and USIs include evaluations based on a 40 year operating life and a 60 year operating life.)

For an issue that is both within the scope of the aging management review or time-limited aging evaluation and within the scope of a USI or GSI, there are several approaches which can be used to satisfy the finding required by §54.29.

- If resolution has been achieved before issuance of a renewed license, implementation of that resolution could be incorporated within the renewal application.
- An applicant may choose to submit a technical rationale which demonstrates that the CLB will be maintained until some later point in time in the period of extended operation, at which point one or more reasonable options (e.g., replacement, analytical evaluation, or a surveillance/maintenance program) would be available to adequately manage the effects of aging. The license renewal application would have to describe the basis for concluding that the CLB is maintained in the period of extended operation and briefly describe options that are technically feasible during the period of extended operation to manage the effects of aging, but it would not have to pre-select which option would be used.
- Another approach could be for an applicant to develop an aging management program, which, 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 license renewal application) which, if approved, would remove the intended function(s) from the CLB.

**1.6 Organization of the Guideline**

Obtaining a renewed operating license is a two-phase approach. The first phase is the technical work that must be performed to generate the information that is included in the license renewal application. The second phase is the preparation of the license renewal application.

The technical work includes determining the systems, structures, and components within the scope of the Rule, identifying the structures and components subject to an aging management review, identifying aging effects, evaluating plant programs, and reviewing TLAA's and exemptions and justifying their applicability for license renewal. The technical phase produces results or information that is ultimately incorporated into the license renewal application, 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

- 1 NRC review. Sections 3.0, 4.0 and 5.0 of this document provide guidance on how to proceed
- 2 through the technical phase. These sections explain what work needs to be done, how to do it, and
- 3 the expected results.
- 4
- 5 Section 6.0 discusses the application phase and identifies the information generated in the technical
- 6 phase (Sections 3.0, 4.0 and 5.0) that is incorporated into the license renewal application and the
- 7 FSAR supplement.

2.0 OVERVIEW OF PART 51

The Rule contains the regulatory requirements that must be satisfied in order to obtain a renewed operating license which allows continued operation of a nuclear power plant beyond its original 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 systems, structures, and components in the period of extended operation and possibly a few other issues related to safety only during the period of extended operation, the regulatory process is adequate to ensure that the licensing bases of all currently operating plants provides and maintains 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.

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 structures and components are adequately managed in accordance with the plant-specific CLB design basis conditions such that the intended functions are maintained in the period of extended operation. This demonstration is documented in the license renewal application.

The license renewal application contains general information, technical information, information regarding technical specifications, 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.

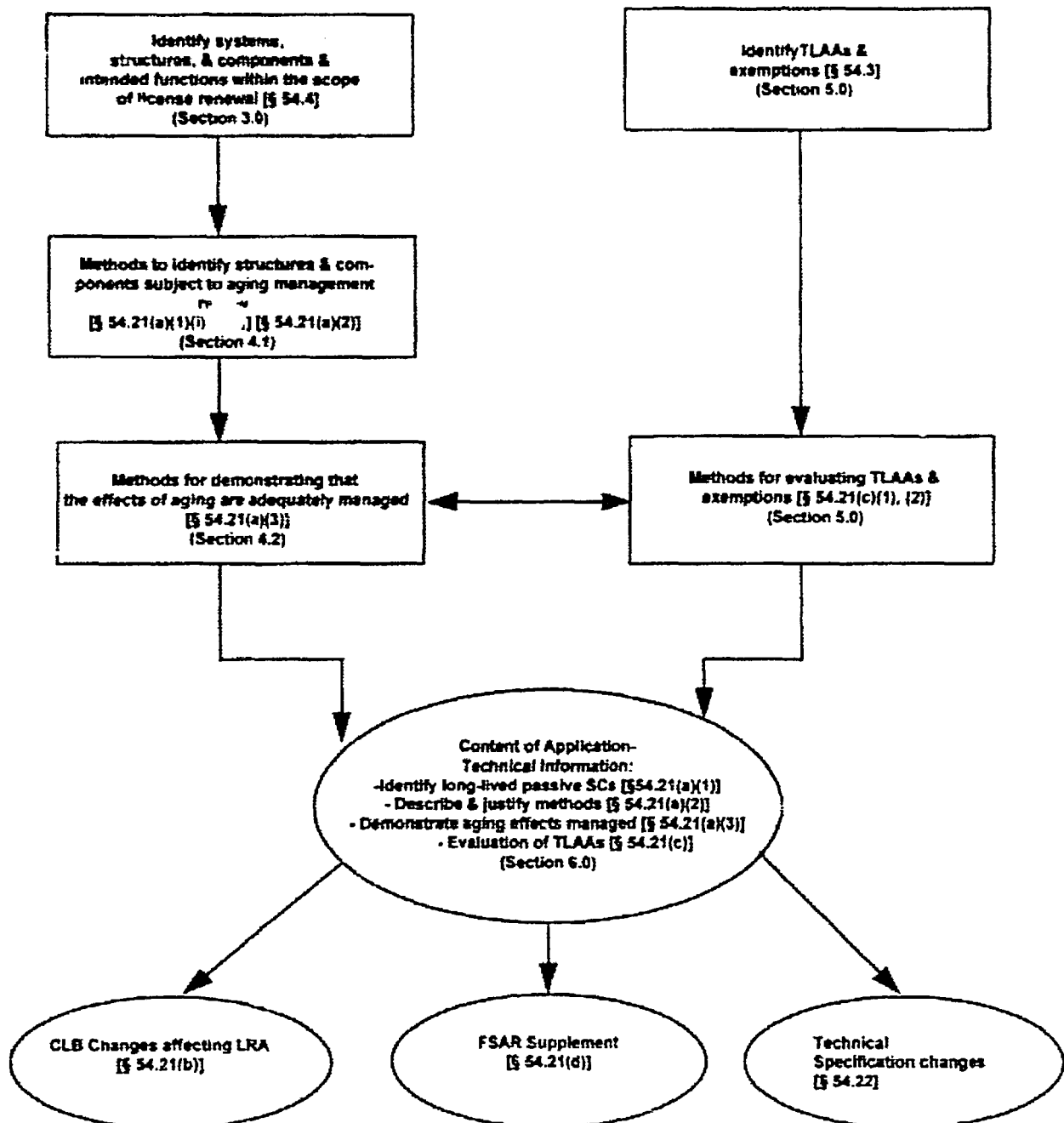
The technical information includes (1) the IPA, which is the demonstration that the effects of aging on long-lived, passive structures and components are being adequately managed such that the intended functions are maintained, consistent with the CLB, in the renewal period, (2) the listing and evaluation of TLAAs and any exemptions in effect which are based on TLAAs, and (3) a supplement to the plant's FSAR which contains a summary description of the programs and activities that are cited as managing the effects of aging and the evaluation of time-limited aging analyses.

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 period of extended operation. Lastly, the application must contain a supplement to the plant's environmental report that complies with the requirements of 10 CFR Part 51.

1 Once the application is submitted to the NRC, it must be amended each year to identify any  
2 changes to the CLB that materially affect the contents of the application, including the FSAR  
3 supplement.

4  
5 Information and documentation required by, or otherwise necessary to document compliance with,  
6 the Rule must be maintained by the applicant in an auditable and retrievable form for the term of  
7 the renewed operating license. Additionally, after the renewed license is issued, the FSAR update  
8 required by 10 CFR 50.71(e) must include any systems, structures, or components newly identified  
9 that would have been subject to an aging management review or evaluation of time-limited aging  
10 analyses in accordance with §54.21.

FIGURE 2.0 -1  
 LICENSE RENEWAL IMPLEMENTATION PROCESS



**3.0 IDENTIFY THE SSCs WITHIN THE SCOPE OF LICENSE RENEWAL  
AND THEIR INTENDED FUNCTIONS**

This section provides a process for determining which of the many systems, structures, and components that make up a commercial nuclear power plant are included within the scope of the Rule. The scoping process described in this guideline is at the system and structure level for the majority of the systems, structures, and components. In subsequent sections, it is assumed that scoping is performed at the system and structure level. 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. (Figure 3.0-1 is a process diagram for this section.)

**3.1 Systems, Structures, and Components Within the Scope of License Renewal**

**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;*

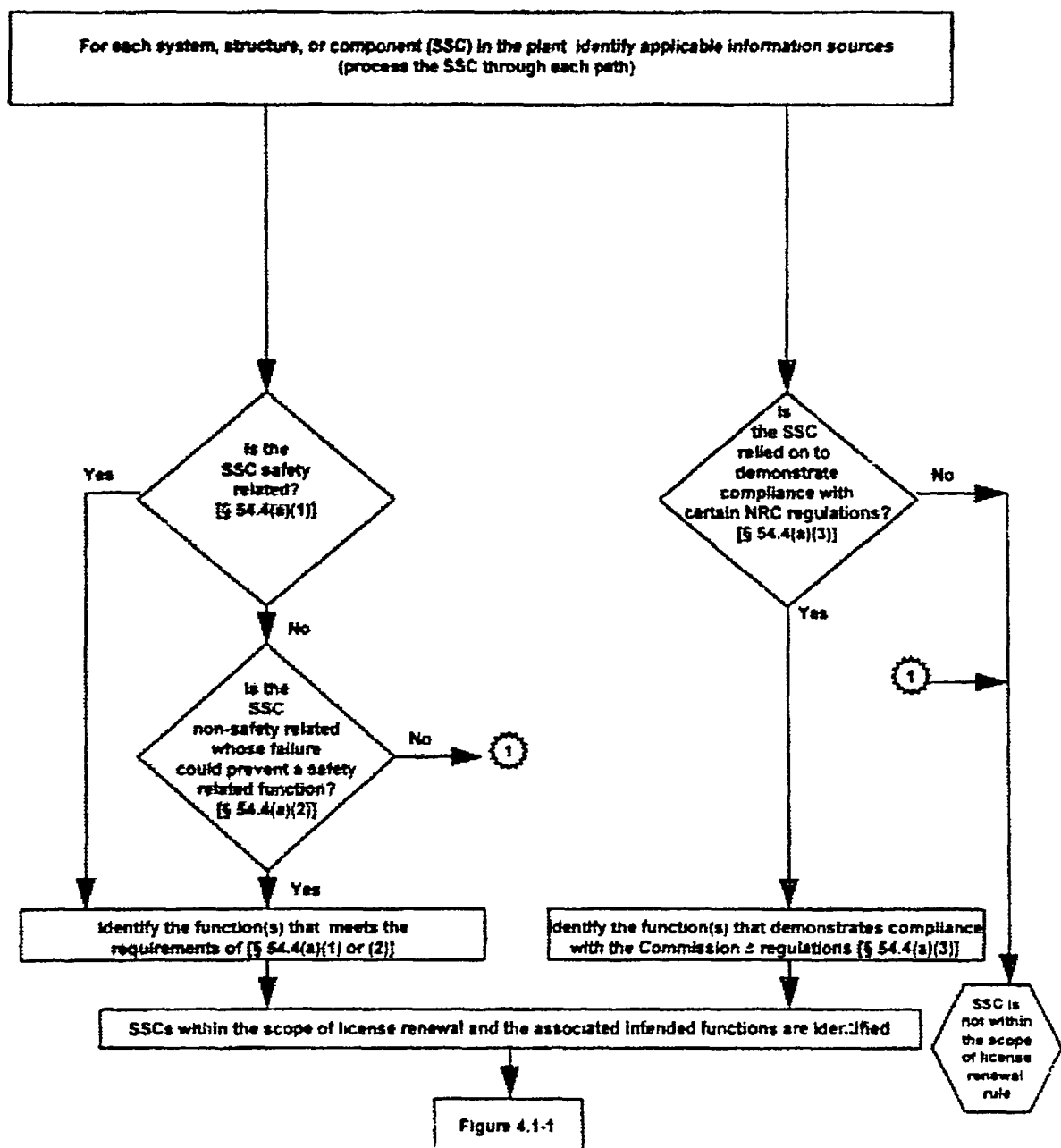
*(ii) The capability to shut down the reactor and maintain it in a safe shutdown condition; or*

*(iii) The capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposure comparable to the 10 CFR Part 100 guidelines.*

*(2) All nonsafety-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 (10 CFR 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 WITHIN THE**  
**SCOPE OF LICENSE RENEWAL [§ 54.4(a) &(b)]**



**3.1.1 Safety-Related Systems, Structures and Components**

There are a number of viable alternatives for identifying safety-related systems, structures, and components. 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 on Table 3.1-1. These sources may be considered as well.

Regardless of the approach used, a safety-related system, structure, or component is within the scope of license renewal 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 offsite exposure comparable to 10 CFR Part 100 guidelines.

It is conceivable that, because of plant unique considerations and preferences, applicants may have previously elected to designate some systems, structures, and components as safety-related that do not perform any of the requirements of Rule §54.4(a)(1). Therefore, a system, structure, or component may not meet the requirements of §54.4(a)(1) although it is designated as safety-related for plant-specific reasons. However, the systems, structures, and components would still need to be evaluated for inclusion into the scope of the Rule using the criteria in §54.4(a)(2) and §54.4(a)(3). For example, an applicant may have designated refueling equipment as safety-related 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) methodology) for making these determinations.

**3.1.2 Nonsafety-Related SSCs Whose Failure Prevents Safety-Related SSCs From Fulfilling Their Safety-Related Function**

There are a number of viable alternatives for identifying nonsafety-related systems, structures, and components that are within the scope of the Rule. 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 on Table 3.1-1. These sources may be considered as well.

Regardless of the approach used, the nonsafety-related systems, structures, and components considered to be in the scope of the Rule are those:

- Whose failure prevents a safety function from being fulfilled; or
- Whose failure as a support system, structure, or component prevents a safety function from being fulfilled.

Examples of these types of systems, structures, and components include nonsafety-related instrument air systems that open containment isolation valves for purge and vent, a nonsafety-related fire damper whose failure would cause the loss of a safety function, or a nonsafety-related system fluid boundary whose failure would cause loss of a safety function.

An applicant should rely on the plant's CLB, actual plant-specific experience, industry-wide operating experience, as appropriate, and existing plant-specific engineering evaluations to determine the appropriate systems, structures, and components 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.

### 3.1.3 Systems 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)<sup>2</sup>
- Pressurized Thermal Shock (10 CFR 50.61)
- 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 systems, structures, and components 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 system, structure, or component 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 operating experience, as appropriate, and existing plant-specific engineering evaluations to determine the appropriate systems, structures, and components 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.

<sup>2</sup> The Statements of Consideration for the amendments to 10 CFR Part 54 [60FR22466] states 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."

- 1 Hypothetical failures that are part of the CLB may require consideration of second- third- or fourth-
- 2 level support systems.

TABLE 3.1-1

**SAMPLE LISTING OF POTENTIAL INFORMATION SOURCES**

•	Verified Databases (A 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
•	Updated Safety Analysis Reports
•	Piping and Instrument Diagrams (P&IDs)
•	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
•	Emergency Operating Procedures
•	Docketed Correspondence
•	System Interaction Commitments
•	Technical Specifications
•	Environmental Qualification Program Documents
•	Regulatory Compliance Reports (Including Safety Evaluation Reports)

3.2 Intended Functions of SSCs Within the Scope of License Renewal

Part 54 Reference

§54.4

\*\*\*\*\*

*(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 in order to perform or support<sup>3</sup> 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 within the scope of license renewal as specified in §54.4(a)(1)-(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 period of extended operation. 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 systems, structures, and components within the scope of the rule. Therefore, as part of the license renewal process, an applicant should establish a methodology that identifies systems, structures, and components within the scope of the rule and the intended functions which are the basis for their inclusion.

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

<sup>3</sup>The term "support" here includes systems, structures, and components whose failure could prevent other SSCs from performing their intended function.

1 The IPA required by §54.21(a) is performed at the structure and component level. Guidance on  
2 the IPA process is provided in Section 4.0 of this guideline. The Rule contains flexibility to  
3 permit an applicant to start the IPA process at either the system/structure or structure/component  
4 level as long as the passive, long-lived structures and components are identified. The intended  
5 functions of the structures and components are the same regardless of the starting point. If the  
6 starting point is the system level, the system intended functions are identified as previously  
7 discussed. However, the intended functions of the structures and components still have to be  
8 determined as discussed in Section 4.1. These functions are the specific functions of the  
9 structures and components that support the system/structure intended function(s). Similarly, if  
10 the starting point is the structure and component level, the intended functions are those that  
11 included these structures and components within the scope of license renewal. A structure or  
12 component may have multiple functions, but only the function(s) meeting the criteria of §54.4  
13 are to be reviewed for license renewal.

14  
15 Examples of the application of this step are provided in Appendix C.

16  
17 The process leading to the maintenance rule scoping determinations may also have produced a  
18 listing of the system and structure functions. Although it is not a requirement of the maintenance  
19 rule, such a listing may be based on a documented procedure that ensures a comprehensive and  
20 consistent approach to defining the functions for all the systems within the scope of the  
21 maintenance rule. If this is the case, then the maintenance rule documentation can be used to help  
22 identify the functions of safety-related systems and nonsafety-related (affecting safety-related)  
23 systems within the scope of the license renewal rule. The information sources used to identify the  
24 systems required for compliance with the regulations in §54.4(a)(3) should be used to identify  
25 their associated functions. If the maintenance rule documentation does not define the system  
26 functions, does not rely on a procedure which uses a structured approach, or the applicant elects  
27 not to use this source, then alternative documentation such as a verified database or a safety  
28 analysis report, operations training manuals, etc., can be used to identify the functions of safety-  
29 related systems and nonsafety-related (affecting safety-related) systems. A sample listing of  
30 information sources that can be used to identify the functions of all systems (and structures and  
31 components) within the scope of the Rule is provided in Table 3.1-1.

1     **3.3           Documenting the Scoping Process**  
2

3     Section 54.37(a) of the Rule requires applicants to retain in an auditable and retrievable form all  
4     information and documentation required by, or otherwise necessary to document compliance  
5     with, the provisions of the Rule.  
6

7     The results of the scoping determination should be documented in a format consistent with other  
8     plant documentation practices. The information may be maintained in "hard-copy" or electronic  
9     format. If available and appropriate, the information may be incorporated into an existing plant  
10    database. The applicant should use the quality assurance program in effect at the plant when  
11    documenting the results of the scoping process.  
12

13    The information to be documented by the applicant should include:  
14

- 15    •     A designation of the plant systems, structures, and components that are safety-related  
16           (§54.4 (a)(1)), meet the requirements of §54.4(a)(2), or meet the requirements of  
17           §54.4(a)(3);  
18
- 19    •     Identification of the systems', structures', and components' functions that meet the  
20           requirements of §54.4(b) and therefore are intended functions; and  
21
- 22    •     The information sources, used to accomplish the above, and any discussion needed to  
23           clarify their use.

1   **4.0           INTEGRATED PLANT ASSESSMENT**

2  
3   The Integrated Plant Assessment (IPA) is the core of the license renewal application. It is the  
4   transition from the scoping process to the screening process where the focus is on components  
5   and structures and their intended functions. Once the systems, structures, and components within  
6   the scope of license renewal are identified, the next step is to determine which structures and  
7   components are subject to an aging management review. Specifically, §54.21(a)(1) states that  
8   the aging management review for a structure or component is directly related to whether the  
9   structure or component performs an intended function without moving parts or without a change  
10   in configuration or properties (i.e., it is passive) and that is not subject to replacement based on a  
11   qualified life or specified time period (i.e. it is long-lived). The IPA also includes a description  
12   and justification of the methodology used to determine the "passive, long-lived" structures and  
13   components and a demonstration that the effects of aging on those structures and components  
14   will be adequately managed so that the intended function(s) will be maintained under all design  
15   conditions imposed by the plant specific CLB for the period of extended operation.  
16  
17  
18  
19

4.1 Identification of Structures and Components Subject to an Aging Management Review 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.

There are a number of different methods that will accomplish the same objective of identifying structures and components subject to an aging management review. Regardless of the method used, it must produce the identification and listing of structures and components required by §54.21(a)(1)(i) and (ii). (Figure 4.1-1 reflects the method described in this section.)

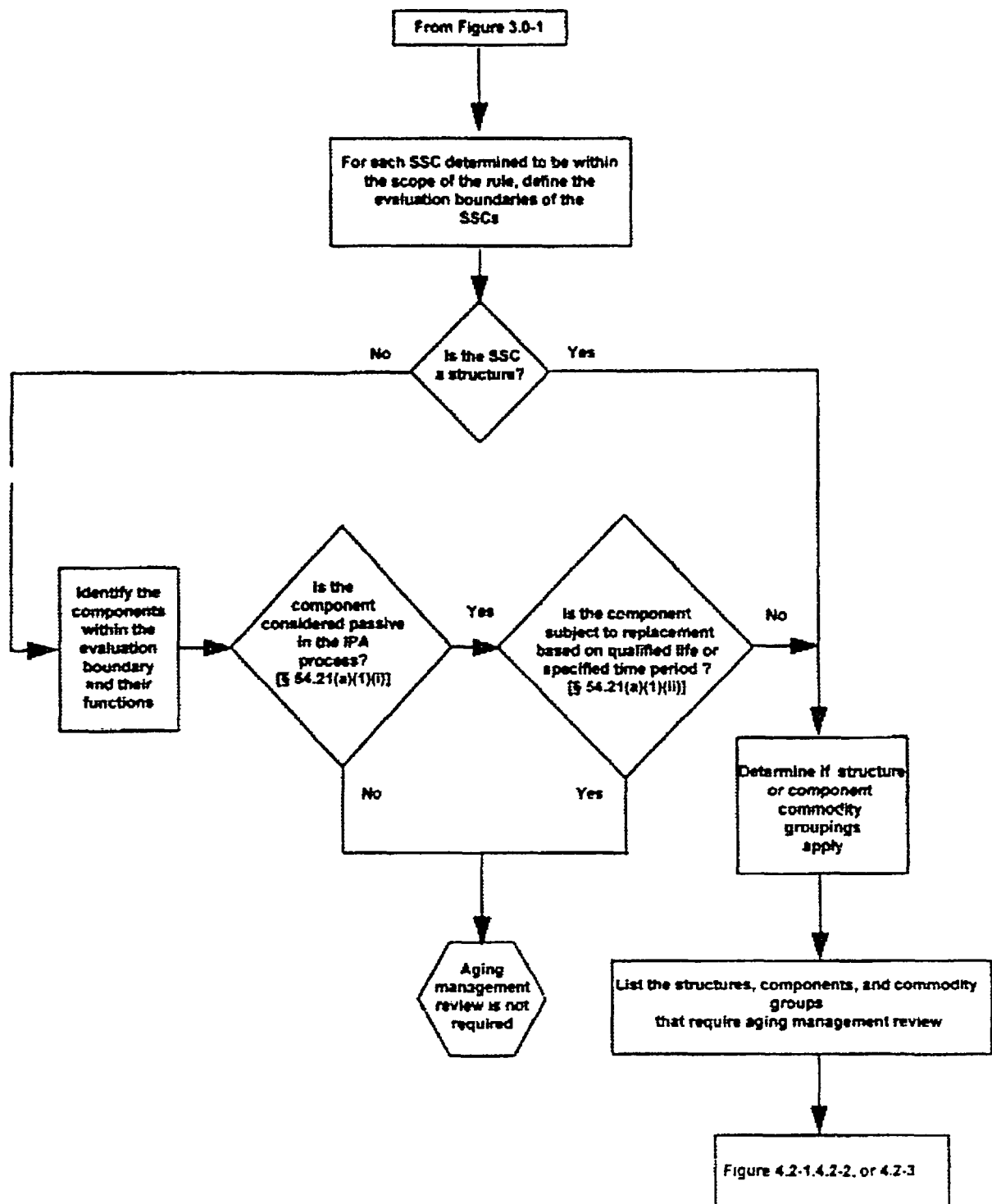
Selection of an appropriate method is highly dependent on the applicant's information management system(s). For example, the availability of computer databases of plant equipment may result in a more efficient component-by-component review process. Absent such databases, an applicant may use a manual review process based on system piping and instrumentation

1 drawings and electrical one-line diagrams supplemented by other available plant documentation  
2 as required.  
3

4 As a minimum, the resulting list developed by the applicant must include all passive, long-lived  
5 structures and components (or commodity groupings) within the scope of license renewal.

6 However, if an applicant chooses for its own reason, the list could be larger (e.g., all passive  
7 structures and components).

**FIGURE 4.1-1**  
**IDENTIFICATION OF STRUCTURES AND COMPONENTS SUBJECT TO**  
**AGING MANAGEMENT REVIEW [§ 54.21(a)(1)]**



#### 4.1.1 Establishing Evaluation Boundaries

If the license renewal scoping was performed at the system/structure level, as discussed in Section 3.2, the identification of structures or components subject to aging management review begins by first determining the system or structure evaluation boundary. The evaluation boundary includes those portions of the system or structure that are necessary for ensuring that the intended functions of the system or structure will be performed. This step documents which portions of the system make up the evaluation boundary.

Documenting the system or structure evaluation boundary is critical and may vary depending on the applicant's method of managing information in the IPA process. One method is to "flag" components in an equipment database as being either inside or outside the evaluation boundary. Another method may be to mark up system drawings to clearly indicate which portions are inside and outside the evaluation boundary. When identifying structures and components within an evaluation boundary, the applicant should rely on the plant's CLB, plant specific experience, industry-wide operating experience, as appropriate, and existing engineering evaluations. Consideration of hypothetical failures that could result from system interdependencies that are not part of the CLB and that have not been experienced previously is not required. The evaluation boundary may not be the normal system boundary as defined by existing plant documentation. However, it is not the intent of this guide to change or redefine the normal system boundaries as a result of license renewal.

There are some structures and components that, when combined, are considered a complex assembly (e.g., diesel generator starting air skids or heating, ventilating, and air conditioning refrigerant units). The Rule and associated SOC do not specifically discuss such assemblies. For purposes of performing an aging management review, it is important to clearly establish the boundaries for review. An applicant should establish the boundaries for such assemblies by identifying each structure and component that makes up the complex assembly and determining whether or not each structure and component is subject to an aging management review. (See example 5 in Appendix C.)

#### 4.1.2 Determining Structures and Components Subject to Aging Management Review and Their Intended Functions

All long-lived passive structures and components which perform or support an intended function without moving parts or a change in configuration or properties are subject to aging management review. For all such structures or components, the structure or component intended function is documented for use during the aging management review steps of the IPA. The structure or component intended function(s) is the specific function of the structure or component that supports the system intended function. Plant specific CLBs require intended functions to be performed under a variety of design conditions. (Table 4.1-1 is a listing of typical passive structure and component intended functions.)

1

TABLE 4.1-1 TYPICAL PASSIVE STRUCTURE AND COMPONENT INTENDED FUNCTIONS
Provide structural support to safety-related components
Provide rated fire barrier to confine or retard a fire from spreading to or from adjacent areas of the plant
Provide shelter/protection to safety-related components
Provide flood protection barrier (internal and external flooding event)
Provide pressure boundary or fission product retention barrier to protect public health and safety in the event of any postulated design basis events.
Provide spray shield or curbs for directing flow (e.g. safety injection flow to containment sump)
Provide pressure-retaining boundary so that sufficient flow and adequate pressure is delivered
Provide shielding against radiation
Provide missile barrier (internally or externally generated)
Provide shielding against high energy line breaks
Provide structural support to nonsafety-related components whose failure could prevent satisfactory accomplishment of any of the required safety-related functions
Provide insulation resistance to preclude shorts, grounds and unacceptable leakage current
Provide pipe whip restraint

1 In making the determinations that a structure's or component's intended function is performed  
2 without moving parts or a change in configuration or properties, it is not necessary to consider  
3 the piece parts of the structure or component. However, in the case of valves and pumps, the  
4 valve bodies and pump casings may perform an intended function by maintaining the pressure  
5 retaining boundary and therefore would be subject to an aging management review.

6  
7 If the structure or component is not subject to replacement based on a qualified life or specified  
8 time period, then it is considered long-lived pursuant to §54.21(a)(1)(ii) of the Rule.

9 Replacement programs may be based on vendor recommendations, plant experience, or any  
10 means which establishes a specific replacement frequency under a controlled program. However,  
11 a structure's or component's qualified life and its replacement must be less than 40 years for it to  
12 be considered as not long-lived in the IPA process. Structures and components with qualified  
13 lives greater than or equal to 40 years are considered to be long-lived. Structures and components  
14 that are not long-lived should not be included in the aging management review.

15  
16 It may be beneficial to create commodity groupings of like structures or components, including  
17 those that are active and passive, to disposition the entire group with a single aging management  
18 review. The basis for grouping structures or components can be determined by such  
19 characteristics as similar design, similar materials of construction, similar aging management  
20 practices, and similar environments. If the environment in which the structure or component  
21 operate suggests potential different environmental stressors, then the commodity grouping  
22 determination also could consider service time, operational transients, previous failures, and any  
23 other conditions that would suggest different results. Appendix B of this guideline is a listing,  
24 although not all-inclusive, of typical plant components, structures, and commodity groupings,  
25 along with a determination of whether the group is active or passive. Applicants are encouraged  
26 to use this appendix in determining structures and components subject to an aging management  
27 review.

28  
29 Structures within the scope of license renewal are long-lived and passive and will require an  
30 aging management review. It may be useful, however, to categorize structures by type (e.g.,  
31 poured concrete, block concrete, structural steel, shield walls, metal siding, foundation on piles,  
32 etc.) in preparation for the aging management review. Subdividing complex structures into  
33 discrete elements (e.g., walls, floors, slabs, doors, penetrations, foundations, etc.) may be useful  
34 because some elements may not have intended functions as defined in the Rule and, therefore,  
35 are not subject to an aging management review. It may also be useful to individually identify  
36 spill containment, flood control and fire barrier structural components where applicable and  
37 appropriate.

38  
39 Structural supports either support or restrain mechanical and electrical equipment (e.g., hangers,  
40 pipe whip restraints, cable trays, and supports). Structural supports can be considered part of or  
41 separate from the applicable structure. This guideline assumes that structural support commodity  
42 groupings will be addressed separately from the applicable structure.

- 1 (Examples in Appendix C show the results of documenting the evaluation boundary as well as
- 2 describing the component's intended functions.)

## 4.2 Aging Management Reviews

### 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.*

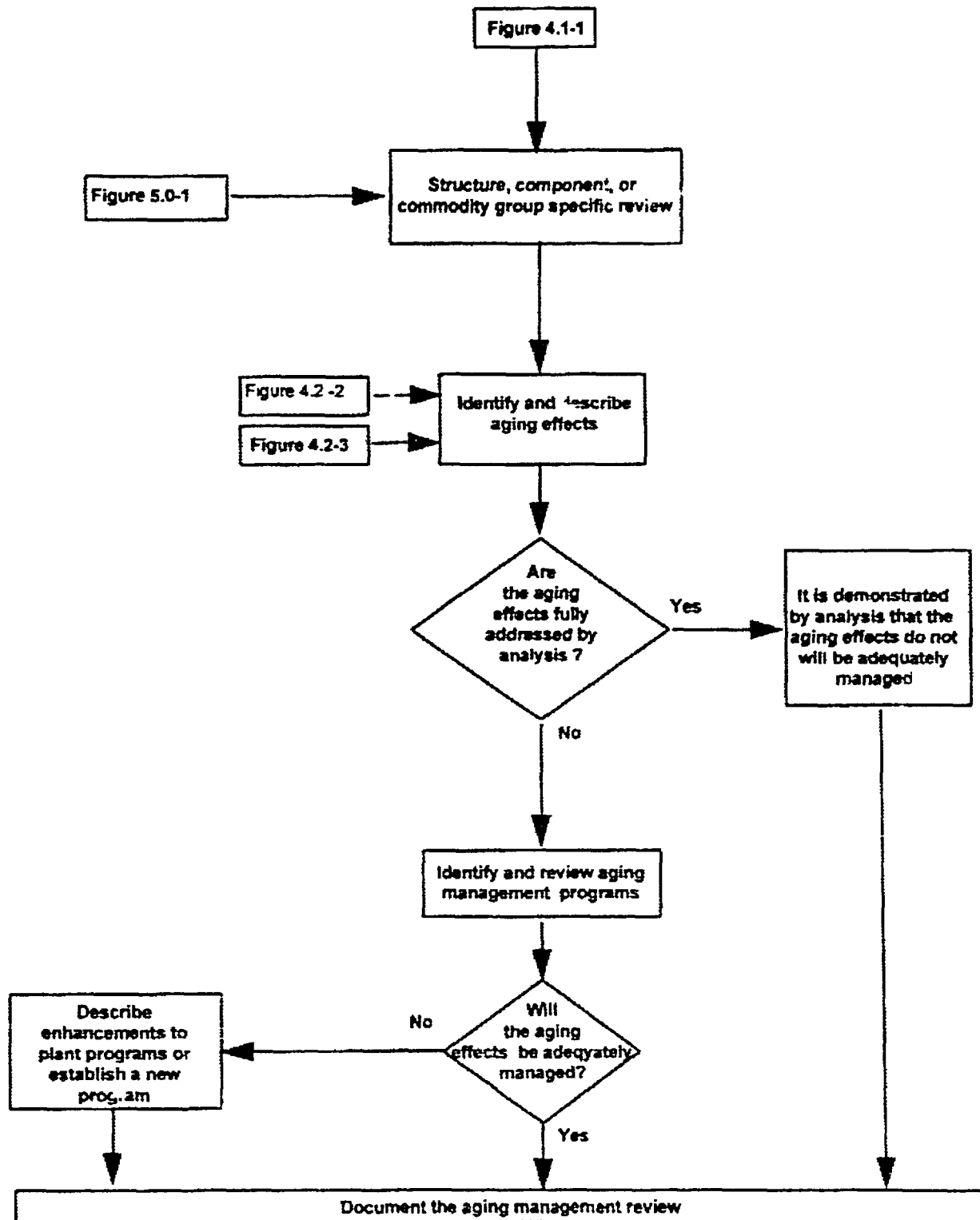
Although there are several approaches to performing an aging management review, three methods are described in this guideline to demonstrate that the effects of aging are being managed such that the intended structure or component function is maintained consistent with the CLB for the period of extended operation. Each method in this section is applicable to evaluations of individual structures, components or commodity groupings.

The first method is a specific review of a structure, component, or commodity grouping. The second method references the results of previous reviews of a similar structures or components which have been found acceptable by the NRC. Examples include the license renewal topical reports developed by the Nuclear Steam Supply System (NSSS) Owners' Groups and previous plant-specific applications. The third method recognizes an applicant's existing performance and condition monitoring programs. However, other methods may be acceptable provided that the demonstration required by §54.21(a)(3) is accomplished.

#### 4.2.1 Specific Structure and Component or Commodity Grouping Demonstration

This demonstration is developed by first understanding how the structure, component, or commodity grouping performs its intended function(s). Next, the aging effects associated with the structure, component, or commodity grouping are identified. Finally, the applicable plant programs are identified, and the ability to detect and mitigate the aging effects are reviewed. The assembled information is then used to demonstrate either that the effects of aging will be managed by existing programs so that the structure or component intended function(s) will be maintained for the period of extended operation or that additional aging management activities are necessary. (Figure 4.2-1 depicts this process.)

**FIGURE 4.2-1**  
**ASSURING THAT THE EFFECTS OF AGING WILL BE MANAGED**  
**[§ 54.21(a)(3)]**



4.2.1.1 Identify and Assess Aging Effects

In Section 3.2 of the guideline, the system, structure, and component intended functions were identified, and in Section 4.1 the structure's or component's intended function(s) was determined. There are various techniques used to identify and assess aging effects. For some structures and components, design margins and/or material properties are known and can be reviewed. In such cases, an analysis may be sufficient to demonstrate that the effects of aging are managed. For other structures and components, performance or maintenance history is available and can be reviewed to assist in demonstrating that the effects of aging are managed. These and other considerations point to the need to determine the appropriate level of review for the type of structure, component, or commodity grouping and plant-unique conditions.

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 structure, component, or commodity grouping. As appropriate, the assessment should include the following activities:

- Assemble information relative to the structure or component 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.
- Identify the aging effects potentially affecting the structures' and components' ability to perform their intended function(s).
- Review the design or material properties to determine if certain aging effects can be shown by analysis not to affect the capability of the structure or component to perform its intended function during the period of extended operation. Of particular interest are parameters such as corrosion allowance, fatigue cycles, loading conditions, fracture toughness, tensile strength, dielectric strength, radiation exposure, and environmental exposure.
- Review and assess the operating and maintenance history for the structure or component. The focus of the review may include the service duty, operational transients, past failures, or unusual conditions that affected the performance or condition of the structure or component. Of particular interest is how the performance or degraded condition of the structure or component has affected the capability of the structure or component to perform its intended function and its risk significance. The review also may include an examination of repairs, modifications, or replacements for relevance to aging considerations.
- Assess industry operating experience and its applicability to determine whether it changes plant-specific determinations.

To determine the aging effects of concern, the applicant should consider and address the materials, environment, and stressors that are associated with each structure, component or commodity grouping under review. In many instances, the proper selection of materials for the operating environment results in few, if any, aging effects of concern. For example, erosion/corrosion has very little or no aging effects of concern on stainless steel piping. Conversely, carbon steel is subject to erosion/corrosion in a raw water environment. However, there should be various programs and activities available to manage the effects of erosion/corrosion on carbon steel piping.

In addition to the consideration of materials, environment, and stressors, the applicant should consider and address the plant-specific CLB, plant and industry operating experience, and existing engineering evaluations in order to identify the aging effects of concern for the structure or component subject to an aging management review. The aging effects of concern are those that have been identified using the considerations described above, and that adversely affect the structure and component such that the intended function(s) may not be maintained consistent with the CLB for the period of extended operation.

By analysis, an applicant may be able to demonstrate that it is not possible for an aging effect to result in a loss of the structure or component's intended function(s) under design basis conditions. The demonstration ultimately should conclude that there is reasonable assurance that the CLB will be maintained for the period of extended operation and therefore that the effects of aging need not be managed. A commitment to an inspection for license renewal, as discussed in Section 4.3, may be needed to verify specific design values, demonstrate that an aging effect is occurring as anticipated, or that an aging effect is not significant. Monitoring industry experience such as the results of inspections for license renewal at other plants may also contribute to the demonstration in these cases.

#### **4.2.1.2 Identify Plant Aging Management Programs**

Plant programs that apply to the structures, components, or commodity groupings should be reviewed to determine if they include actions to detect and mitigate the effects of aging. The Rule does not contain specific requirements for features of an acceptable aging management review program. These features may vary depending on the structure, component, or commodity grouping. However, features to consider are:

- Preventive actions are in effect that mitigate or prevent the onset of degradation or aging effects, and their effectiveness is periodically verified.
- Parameters are monitored, inspected, and/or tested, that provide direct information about the relevant aging effect(s), and their impact on intended functions.
- There is an action, alert value, or condition parameter to determine the need for corrective action.

- Corrective actions are taken (this includes root cause determinations and prevention of recurrence where appropriate) in a timely manner or an alternative action is identified.
- There is a confirmation process that ensures that the corrective action was taken and was effective.
- The program is administratively controlled by a formal review and approval process.

The monitoring inspection, and/or testing frequency should be identified and reviewed. This may be done by examining the plant and/or industry operating experience and confirming that the frequency of the action(s) is appropriate for timely detection of the aging effects.

#### **4.2.1.3 Demonstrate That the Effects of Aging Are Managed**

The previous steps involve investigations to collect and establish supporting information and objective evidence for the aging management demonstration. When it is determined that there is an applicable aging effect for a particular structure, component or commodity grouping, the Rule requires that the applicant demonstrate that the effects of aging are adequately managed so that the intended function(s) will be maintained consistent with the CLB, for the period of extended operation.

This demonstration must consider the aging effect(s) and its impact on the intended function. The demonstration also should determine whether the action taken in accordance with the aging management program provides reasonable assurance that the structure and component function will be maintained, in accordance with the CLB, for the period of extended operation. In performing the demonstration, consider all programs and activities associated with the structure or component. For example, the primary program for piping may be an inspection program. However, a water chemistry program also would be relevant to maintaining the condition of the piping. This in turn provides additional justification that the intended function of the piping will be maintained in the period of extended operation.

The demonstration is not intended to be a reverification of the structure or component 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 structure or component intended function. This verification may consist of: (1) a physical measurement at susceptible locations or on a sampling basis as justified, or (2) 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 period of extended operation. For example, a safety-related 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 erosion/corrosion. A loss of material could result in pipe wall thinning below design values rendering the pipe unable to sustain its

1 design loads. However, erosion/corrosion affects piping differently depending on the material of  
2 construction. Carbon steel piping may be susceptible to loss of material due to erosion/corrosion  
3 and it would be appropriate to evaluate the pipe wall thickness to verify that this design value  
4 remains acceptable. Conversely, stainless steel piping is resistant to loss of material from  
5 erosion/corrosion and this aging effect normally would not be significant and thus, it would not  
6 be necessary to evaluate the pipe wall thickness to verify this design value.

7  
8 To perform the required demonstration, the applicant should construct a review checklist that  
9 corresponds to the scope of the review for the structure or component. That is, there is not just  
10 one set of criteria for demonstrating that the aging effects will be managed. The criteria should be  
11 thought of as a logical presentation of the review that leads to the required conclusion. The  
12 following are considered to be elements that may be used to construct an appropriate review  
13 checklist.

- 14  
15 • The scope of the credited program(s) includes the specific structure or component subject  
16 to aging management review.
- 17  
18 • The aging effect(s) are detected by one or more of the credited programs before there is a  
19 loss of the structure's or component's intended function.
- 20  
21 • The program(s) contains acceptance criteria against which the need for corrective action  
22 will be evaluated, and ensures that timely corrective action will be taken when these  
23 acceptance criteria are not met.
- 24  
25 • Monitoring and trending provides an adequate predictability and timely corrective or  
26 mitigative actions.
- 27  
28 • The program(s) is subject to administrative controls.

29  
30 If all the elements of the checklist constructed by the applicant cannot be satisfied, appropriate  
31 enhancements to existing programs or new programs may be needed. Enhancements to existing  
32 programs may include, but are not limited to, verification of specific design values by  
33 inspection(s), adding steps to a procedure for specific aging effects, changing the frequency of  
34 the required task, adding specific aging effects mitigation procedures, and/or changing the  
35 record-keeping requirements. The factors that should be considered when selecting an  
36 appropriate program enhancement from acceptable alternatives include:

- 37  
38 • The risk significance of the structure or component.
- 39  
40 • The nature of the aging effect (i.e., is it readily apparent/easily detected?).
- 41  
42 • The feasibility of repair/replacement of the affected component or structure.

- 1 • The compatibility/adaptability of existing programs to detect and manage the aging  
2 effect(s).
- 3
- 4 • The existence of technology to detect and manage the aging effect(s).
- 5
- 6 • The estimated cost, personnel radiation exposure, and impact on normally scheduled  
7 outage duration for determining the enhancement.
- 8

9 If existing programs, with or without enhancements, are not adequate for managing the effects of  
10 aging, new programs or other actions shall be developed as appropriate. One action an applicant  
11 should consider is an inspection as discussed in Section 4.3. It is possible that an applicant is  
12 already performing a relevant inspection or has previously performed an inspection that produced  
13 appropriate data for license renewal. Other actions for consideration are refurbishment<sup>4</sup> or  
14 replacement.

15  
16 Appendix C contains examples of methods that could be used to manage aging effects on the  
17 selected structures or components in order to ensure that their intended functions are maintained,  
18 consistent with the CLB, during the period of extended operations.  
19

---

<sup>4</sup> Refurbishment, for purposes of this guideline, means planned actions, short of full replacement, to provide reasonable assurance that the effects of aging are adequately managed such that the intended functions are maintained in accordance with the CLB for the period of extended operation.

1     **4.2.2           Reference Previous Reviews**

2  
3     The evaluation of the effects of aging on the performance and reliability of plant systems,  
4     structures, and components has been and continues to be an ongoing activity of the industry.  
5     Considerable effort already has been applied to examining the effects of aging on those  
6     components and structures which are long-lived and passive. Several NSSS Owners Groups are  
7     preparing generic reports (topical) that address the requirements of the Rule. These reports also  
8     will be submitted to the NRC for review and acceptance. Additional material will become  
9     available when applicants prepare and submit their license renewal applications.

10  
11    This progress of events is producing a growing "library" of reports which document aging  
12    management reviews of a variety of structures, components, or commodity groupings. This  
13    library will afford license renewal applicants the option of relying on referenceable results of a  
14    previous aging management review. If such an option is selected, the elements of the aging  
15    management review should include identifying and demonstrating the applicability of a previous  
16    review and then demonstrating that the results and conclusions are in effect at the plant.

17  
18    Guidance is provided below for each element of the review. Figure 4.2-2 is a diagram that  
19    depicts this process. The applicant also may elect to perform a specific (or plant-unique) aging  
20    management review of the structure or component as described in guideline Section 4.2.1.

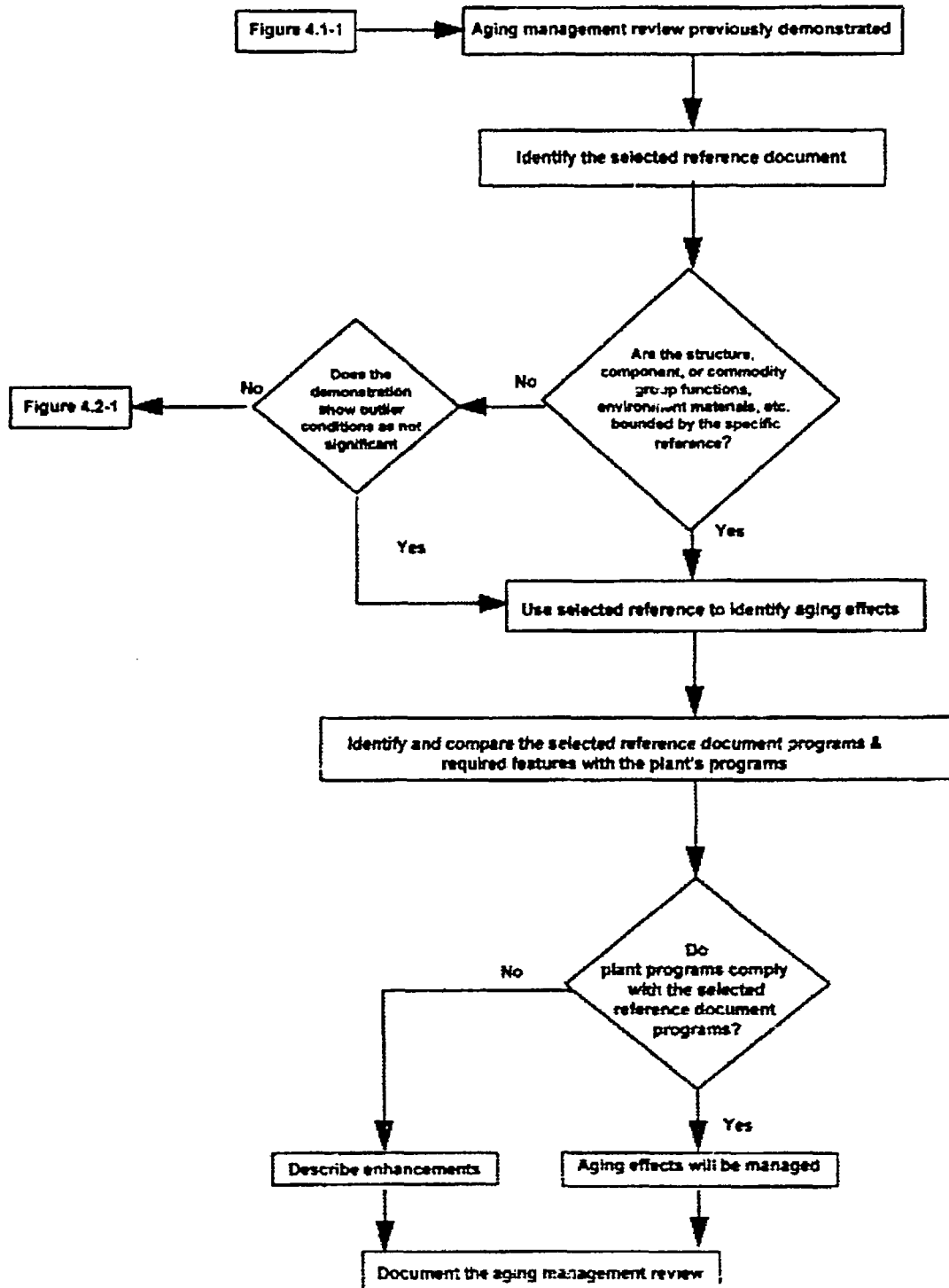
21  
22    **4.2.2.1       Identify and Demonstrate Applicability of the Selected Reference**

23  
24    Plant and generic industry references that provide an aging management review of the same type  
25    of structure or component should be reviewed. A search of the public document room indices  
26    may be performed to identify any such reports. References that have been reviewed and approved  
27    by the NRC provide an acceptable approach.

28  
29    In the selected reference, identify the scope, assumptions, and limitations affecting the results  
30    and conclusions of the analysis. Other characteristics that may need to be identified include the  
31    configuration, functions, materials, service conditions, and the original design parameters  
32    (corrosion allowance, loading cycles, etc.) and protective measures (coatings, cathodic  
33    protection, etc.) affecting the expected service life of the structure or component.

34  
35    The identified characteristics of the structure or component in the selected reference should be  
36    compared to the plant specific structure or component. The objective is to demonstrate that the  
37    plant characteristics are the same as, or are bounded by, the reference and therefore, it may be  
38    concluded that the selected report is applicable and may be used as a basis for the aging  
39    management review of the plant structure or component. Any outlier conditions should be  
40    identified and reviewed to show that they are not significant with respect to the results or

FIGURE 4.2-2  
ASSURING THAT THE EFFECTS OF AGING WILL BE MANAGED  
[§ 54.21(a)(3)] USING A PREVIOUS REVIEW



1 conclusions of the selected reference. Otherwise, a structure or component-specific aging  
2 management review (guideline Section 4.2.1) of the outlier condition should be performed.

3  
4 **4.2.2.2 Demonstrate That the Effects of Aging are Managed**

5  
6 The selected reference should be used to identify the aging effects. It also should be  
7 demonstrated that the assumptions and basis used for determining the aging effects are applicable  
8 to the plant. To do this, a review of the plant operating and maintenance history should be  
9 performed to confirm that all aging effects apply. Adjustments to the referenced aging effects due  
10 to plant-specific conditions may be required. The results may be factored into the description of  
11 the aging effects.

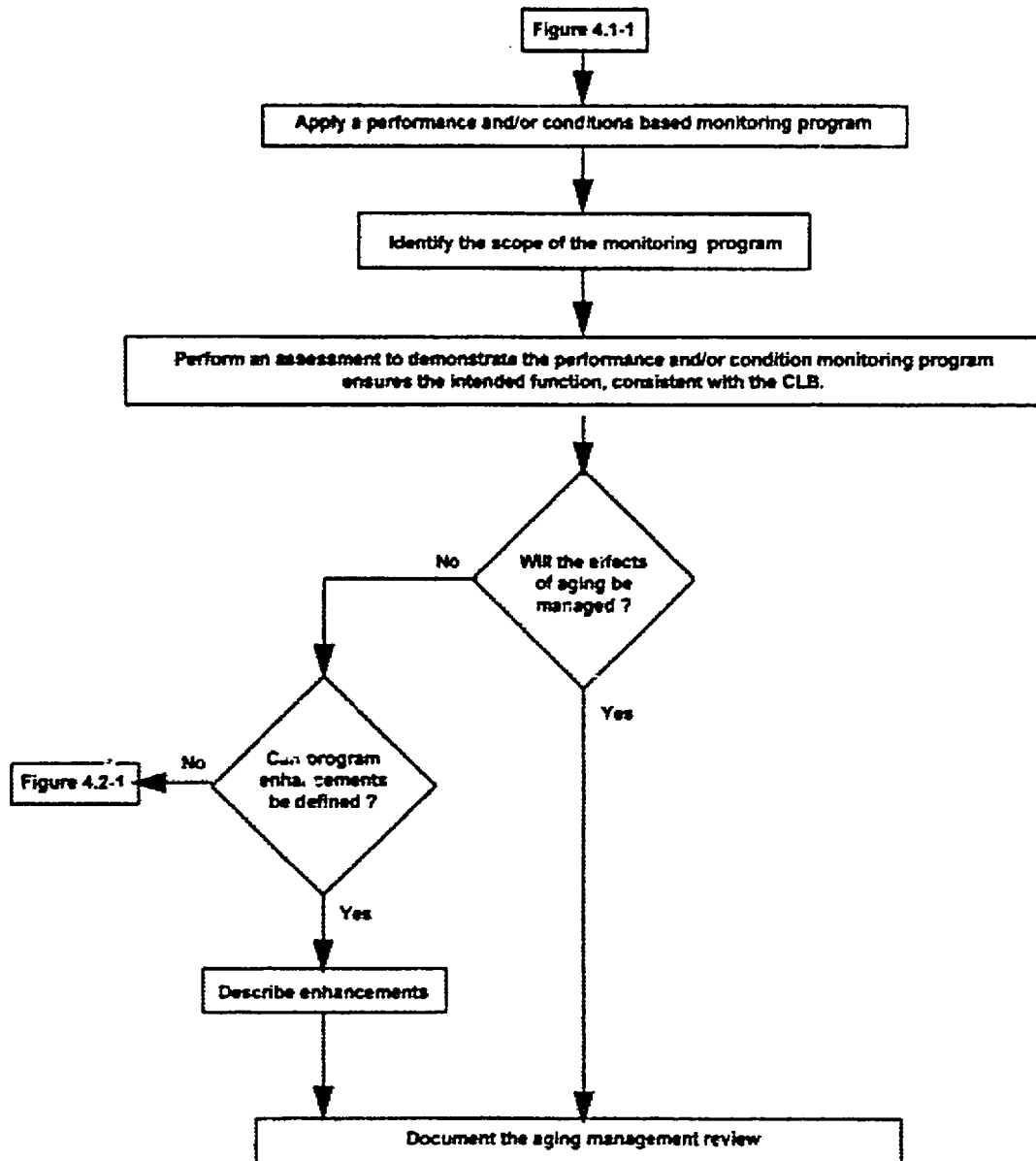
12  
13 The selected reference should be used to identify the programs and features of the programs  
14 credited in the review. The comparable plant programs should be identified, and their features  
15 should be compared to the programs in the selected reference. Any differences should be  
16 identified, and it should be justified that conclusions of the selected reference still apply. The  
17 justification may be based on plant-unique features, plant operating and maintenance history,  
18 and/or industry developments since the selected reference was issued and reviewed by the NRC.

19  
20 Any enhancements to current programs or new programs that are cited in the selected reference  
21 should be identified. The enhancement(s) that will be implemented for the plant structure or  
22 component should be described.

23  
24 **4.2.3 Application of Existing Performance and/or Condition Monitoring Programs**

25  
26 The Rule does not prescribe the explicit types of programs and activities that are necessary to  
27 demonstrate that the effects of aging will be adequately managed so that the intended function(s)  
28 will be maintained for the period of extended operation. Because of this, there is sufficient  
29 flexibility for an applicant to determine what types of programs and activities fit the needs of the  
30 structure or component for that facility. This includes the use of performance and/or condition  
31 monitoring programs to demonstrate that for long-lived, passive structures or components, the  
32 effects of aging will be adequately managed so that the intended function(s) will be maintained for  
33 the period of extended operation. Condition monitoring programs generally assess passive aspects of  
34 structures and components based on inspection activities. Performance monitoring programs  
35 generally assess active functions of components based on testing activities. However, it may be  
36 possible to use the results of performance monitoring programs to assess the passive aspects of  
37 structures, components, or commodity groupings. (Figure 4.2-3 shows the process for using these  
38 programs.)

**FIGURE 4.2-3**  
**ASSURING THAT THE EFFECTS OF AGING WILL BE MANAGED**  
**[§54.21(a)(3)] USING A MONITORING PROGRAM**



**4.2.3.1 Establishing the Relationship Between Degradation and Active Performance**

The degradation of many passive structures and components may not be as readily apparent through performance and condition monitoring as degradation of active structures and components. This is the reason the Rule requires an aging management review of such passive structures and components and a demonstration that the effects of aging are adequately managed.

Some passive structures and components may have degradation characteristics that can be monitored through changes in active performance of associated structures and components. In turn, these changes in active performance generally are readily detectable through existing performance and conditioning monitoring programs. The aging management review for these passive structures and components could focus on demonstrating the relationship between passive degradation and active performance. Whatever the aging management review approach, including performance or condition monitoring, the applicant must demonstrate that the aging effects of the structure or component will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation.

**4.2.3.2 Demonstrating the Effectiveness of the Performance and Condition Monitoring Programs**

Once the link is established between degradation of passive functions and the active performance of the component or commodity grouping, the next step is to demonstrate that the component or commodity grouping is subject to a performance and condition monitoring program. By using the above process the applicant should be able to demonstrate that these comprehensive performance and condition monitoring programs provide reasonable assurance that the aging effects on the intended functions of the components or commodity groupings are adequately managed in accordance with the plant-specific CLB.

If existing performance/condition monitoring programs, with or without enhancements, are not adequate for managing the effects of aging, new programs or other actions shall be developed as appropriate. For example, a particular performance or condition monitoring program may only provide reasonable assurance that the intended function can be performed under normal loading conditions. Additional evaluation and/or inspection may be required to provide reasonable assurance that the component or commodity grouping will perform its intended function(s) under CLB design conditions. Guidance on inspections is provided in Section 4.3. It is possible that an applicant is already performing a relevant inspection or previously has performed an inspection that produced appropriate data for license renewal. Other actions for consideration are refurbishment<sup>5</sup> or replacement.

---

<sup>5</sup> Refurbishment, for purposes of this guideline, means planned actions, short of full replacement, to provide reasonable assurance that the effects of aging are adequately managed such that the intended functions are maintained in accordance with the CLB for the period of extended operation

1   **4.2.3.3        Guidelines for Use of Performance and Condition Monitoring Programs**

2  
3   Because only a select set of plant equipment has the characteristic that degradation of passive  
4   functions will be readily apparent in the active performance of associated components, this  
5   approach has limited application in the IPA. The following guidelines should be used to determine  
6   when this approach may be appropriate:

- 7
- 8   •     The intended function is a pressure-retaining function which directly supports the  
9         performance of an active component. This will increase the likelihood that the  
10        demonstration that degradation directly affects active performance will be successful;
  - 11
  - 12   •     The pressure-retaining function is not a fission product boundary function. It is not likely  
13         that an applicant will be able to link degradation of the fission product boundary to the  
14         active performance of any structure or component which is subject to a performance and  
15         condition monitoring program;
  - 16
  - 17   •     The system intended functions are performed by redundant trains. This will ensure that  
18         sufficient opportunity exists to conduct comprehensive performance and condition  
19         monitoring of the equipment;
  - 20
  - 21   •     Performance testing is well documented with verification that corrective actions assure  
22         the continued performance of all intended functions. This will ensure there is sufficient  
23         history with the performance and condition monitoring program to correct any  
24         inadequacies in the program's ability to detect degraded performance or condition; AND
  - 25
  - 26   •     The complex assembly is covered by the maintenance rule. This will ensure that a  
27         regulated mechanism is in place for incorporating any adverse experience with the  
28         program (either at the utility or in the industry) into appropriate enhancements to the  
29         program.
  - 30

31   If these guidelines are met, then an applicant should consider use of this approach to provide the  
32   §54.21.(a)(3) demonstration rather than the techniques described in previous sections. However,  
33   meeting these criteria should not be interpreted as any part of the demonstration. The criteria are  
34   provided here merely as an aid to the applicant in determining when to attempt this approach.

### 4.3 Application of Inspections for License Renewal

Section 4.2 discusses options for performing an aging management review. If the applicant concludes, after reviewing the options or implementing the option, that the demonstration has not achieved reasonable assurance, an inspection program for license renewal may be appropriate. This section provides guidance on the elements of an inspection program including the use of sampling and the timing of such inspections.

#### 4.3.1 Inspection Program

The Rule does not contain any requirements for features of an acceptable inspection program. The elements of an inspection program may vary depending on the specific structure, component, or commodity grouping that is subject to aging effects of concern. However, features to consider are:

- Purpose: The inspection program should provide reasonable assurance that the specific aging effect is adequately managed or need not be managed.
- Scope: The scope of the inspection program may be a specific component, structure, or commodity grouping. The scope also may be a representative sample of a commodity grouping if justified.
- Inspection Methods: The programs should describe an inspection method that is capable of either (1) detecting the effects of aging before the structure or component would lose the ability to perform its intended function under design conditions, or (2) demonstrate that the structure or component intended function will be maintained during the period of extended operation without the need for an aging management program.
- Analysis of Results: The inspection program should include a methodology for analyzing the results of the inspection against applicable acceptance criteria. The methodology should be capable of determining the ability of the structure or component to perform its intended function for the period of extended operation under design conditions required by the plant-specific CLB. The results of the inspection also should be evaluated to assess whether the sample size is adequate or if it needs to be expanded.
- Corrective and Follow-Up Actions: The inspection program should discuss when corrective actions and/or follow-up activities are implemented if appropriate. As appropriate, consideration should be given to root cause analysis, actions to prevent recurrence and repair/replacement.
- Conclusion: The inspection program should include a final conclusion on whether the purpose been achieved.

1   **4.3.2           Sampling**

2  
3   When the applicant determines an inspection is necessary, sampling may be used to evaluate a  
4   group of structures or components. If sampling is used, a program should be developed which  
5   describes and justifies the methods used for selecting the population and the sample size.  
6

7   **4.3.2.1        Population**

8  
9   A population is the collection of the structures or components to be inspected under a sampling  
10   plan. Selection of the population demands attention to similarity of material of construction,  
11   fabrication, procurement, design, installation, operating environments, and aging effects.  
12

13   **4.3.2.2       Sample Size**

14  
15   A sample consists of one or more structures or components drawn from the population. The  
16   applicant must determine a sample size that is adequate to provide reasonable assurance that the  
17   effects of aging on the structure or component will not prevent the performance of its intended  
18   function during the period of extended operation. The size of the sample should include  
19   consideration of the specific aging effect(s), location, existing technical information, materials of  
20   construction, service environment, previous failure history, etc. The sample should be biased  
21   towards locations most susceptible to the specific aging effect(s) of concern.  
22

23   **4.3.3           Timing of Inspections**

24  
25   An inspection for license renewal may be performed at various times. It may be performed prior  
26   to submittal of the license renewal application. The license renewal application may include a  
27   commitment to perform an inspection prior to the commencement of the period of extended  
28   operation. There also may be justification for performing the inspection during the period of  
29   extended operation.

**4.4 Documenting the Integrated Plant Assessment**

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.

**4.4.1 Documenting the Identification of Structures Subject to an Aging Management Review**

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

- An identification and listing of structures and components subject to an aging management review and their intended functions.
- A description and justification of the methods used to determine the structures and components that are subject to an aging management review.
- 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 6.0.

**4.4.2 Documenting the Aging Management Review**

The information to be documented by the applicant should include:

- An identification of the applicable aging effects of concern for the structures and components subject to an aging management review.
- An identification of the specific programs or activities which will manage the effects of aging for each structure, component, or commodity grouping 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.

1  
2 • A discussion of any assumptions or special conditions used in applying or interpreting the  
3 source documents

4  
5 • A description of inspection programs for license renewal.

6  
7 The information documented and retained by the applicant will form the bases of the information  
8 contained in the Application as further discussed in Section 6.0.  
9  
10

**5.0 TIME-LIMITED AGING ANALYSES INCLUDING EXEMPTIONS**

The Rule requires Time-Limited Aging Analyses (TLAA) be evaluated. It is intended that TLAA's 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, based on TLAA's, to be identified and analyzed to justify continuation into the period of extended operation. (Figure 5.0-1 outlines the process for evaluating TLAA's and exemptions.)

**5.1 Time-Limited Aging Analyses**

**Part 54 Reference**

**§54.3**

\*\*\*\*\*

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

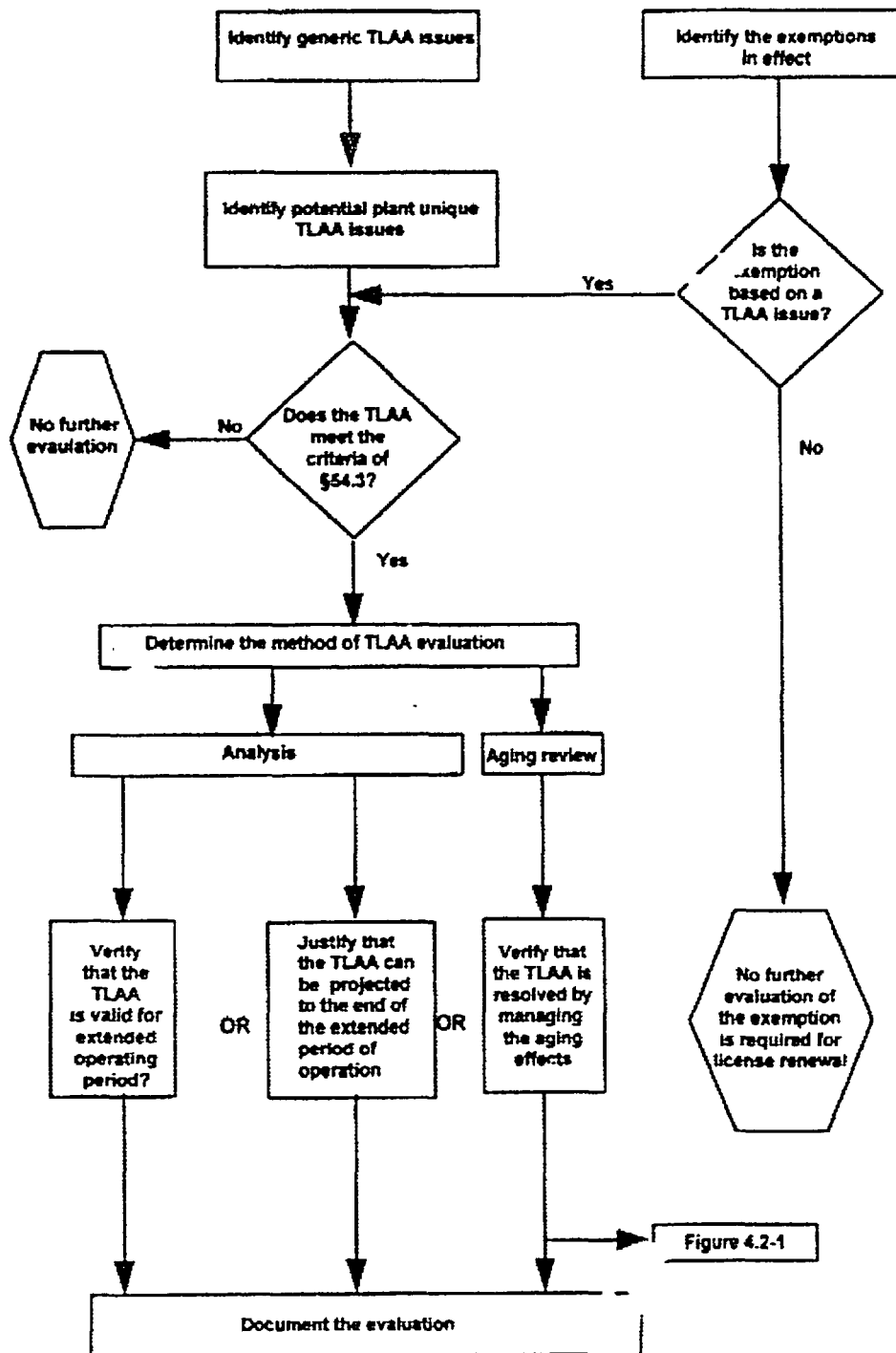
- (1) Involve systems, structures, and components within the scope of license renewal, as delineated in §54.4(a);*
- (2) Consider the effects of aging;*
- (3) Involve time-limited assumptions defined by the current operating term, for example, 40 years;*
- (4) Were determined to be relevant by the licensee 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 TLAA's AND EXEMPTIONS [§ 54.21(c)]



1 The applicant must identify the plant-specific TLAA by applying the six criteria delineated in  
2 §54.3. The criteria may be applied in any order depending on plant specific document search  
3 capabilities that exist. Guidance for applying the six criteria is provided below.

4  
5 1. Involve systems, structures, and components within the scope of license renewal as  
6 delineated in §54.4(a). The system, structure, and component scoping step of the IPA  
7 (Section 3.0) should be performed prior to or concurrent with the TLAA identification.

8  
9 2. Consider the effects of aging. The effects of aging include but are not limited to: loss  
10 of material, loss of toughness, loss of prestress, settlement, cracking, and loss of dielectric  
11 properties.

12  
13 3. Involve time-limited assumptions defined by the current operating term, for example  
14 40 years. The defined operating term should be explicit in the analysis. Simply asserting  
15 that a component is designed for a service life or plant life is not sufficient. The assertion  
16 must be supported by a calculation or analysis that explicitly includes a time limit.

17  
18 4. Were determined relevant by the licensee in making a safety determination.  
19 Relevancy is a determination that the licensee must make based on a review of the  
20 information available. A calculation or analysis is relevant if it can be shown to have  
21 direct bearing on the action taken as a result of the analysis performed. Analyses are also  
22 relevant if they provide the basis for the licensee's safety determination and, in the  
23 absence of the analyses, the licensee may have reached a different safety conclusion.

24  
25 5. Involve conclusions or provide the basis for conclusions related to the capability of the  
26 system, structure, or component to perform its intended functions as delineated in  
27 §54.4(b). As stated in the first criterion, the intended functions must be identified prior to  
28 or concurrent with the TLAA identification. Analyses that do not affect the intended  
29 functions of the system, structure, or components are not TLAAs.

30  
31 6. Are contained or incorporated by reference in the CLB. Plant specific documents  
32 contained or incorporated by reference in the CLB include the FSAR, SERs, Technical  
33 Specifications, the fire protection plan/hazards analyses, correspondence to and from the  
34 NRC, QA plan, topical reports included as reference to the FSAR or correspondence to  
35 the NRC. Calculations and analyses that are not in the CLB or not incorporated by  
36 reference are not TLAAs. When the Code of record is mentioned in the FSAR, for  
37 particular groups of structures or components, referenced material includes all  
38 calculations required by that Code of record for those structures and components.

39  
40  
41 All six criteria must be satisfied to conclude that a calculation or analysis is a TLAA. As an aide  
42 to applicants, Table 5.1-1 provides examples of how the six criteria may be applied and Table  
43 5.1-2 lists potential TLAA's 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's that are specifically identified in the SOC for the Rule

Identified plant-specific TLAA's must be evaluated using one of three different approaches. These approaches are described in §54.21(c)(1) of the Rule. One approach is to verify that the analysis remains valid for the period of extended operation. 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 period of extended operation. 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 period of extended operation. Guidance for this approach is provided in Section 5.1.3.

#### **5.1.1 Verify that the TLAA is Valid for the Period of Extended Operation**

Typically, the existing TLAA's are based on the current operating term (e.g., 40 years). Therefore, the approach outlined in this section may not be applied for the extended operating term and one of the other approaches (see Sections 5.1.2 and 5.1.3) should be utilized. However, 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 period of extended operation. A structure or component may have been qualified for at least 40 years. A detailed review of the analysis may demonstrate that the qualification is valid for the period of extended operation 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, relevant aging effect(s), and intended function(s). It should be demonstrated that (1) the conditions and assumptions used in the analysis already address the relevant aging effect(s) for the period of extended operation, 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 Period of Extended Operation**

The current TLAA may not be valid for the period of extended operation; however, it may be possible to revise the TLAA by recognizing and re-evaluating any conservative conditions and assumptions. Examples include relaxing overly conservative assumptions in the original analysis, using new or refined analytical techniques, and/or performing the analysis using a 60 year life. The TLAA may then be shown to be valid for the period of extended operation.

1     **5.1.3           Verify that the TLAA is Resolved by Managing the Aging Effects**

2  
3     The structure(s) or component(s) associated with the TLAA issue should be identified. The TLAA  
4     issue should be described with respect to the objectives of the analysis, conditions, and assumptions  
5     used in the analysis, acceptance criteria, relevant aging effect(s) and intended function(s). The  
6     guidance provided in Section 4.2 may be used to demonstrate that the effects of aging on the  
7     intended function are adequately managed for the period of extended operation. For example,  
8     poisons in the high density spent fuel racks have coupons that are periodically removed and tested  
9     to verify that the rack continues to be capable of performing its intended function.

10  
11    **5.1.4           Timing for Evaluation of TLAA**

12  
13    In general, the evaluation of TLAA's should be completed and submitted at the time of renewal  
14    application. However, there may be instances when the completion of the evaluation of TLAA's  
15    can be deferred to a time after the issuance of the renewal license.

16  
17    When an applicant elects to defer completing the evaluation of a TLAA at the time of renewal  
18    application, the applicant should submit the following details in the renewal application to support a  
19    conclusion that the effects of aging addressed by that TLAA will be managed for a specific  
20    structure or component:

- 21  
22    • Details concerning the methodology which will be used for TLAA evaluation,  
23  
24    • Acceptance criteria that will be used to judge the adequacy of the structure or component,  
25    consistent with the CLB, when the TLAA evaluation or analysis is performed,  
26  
27    • Corrective actions that the applicant could perform to provide reasonable assurance that the  
28    component in question will perform its intended function when called upon or will not be  
29    outside of its design basis established by the plant's CLB, and  
30  
31    • Identification of when the completed TLAA evaluation will be submitted to ensure that the  
32    necessary evaluation will be performed before the structure or component in question would not  
33    be able to perform its intended functions established by the CLB.

TABLE 5.1-1  
 DISPOSITION OF POTENTIAL TLAA's 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.	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	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 6 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 lift off forces are calculated for the 40 year life of the plant. This data is used during Technical Specification surveillance for comparing measured to predicted lift off forces.	This example is a TLAA because it meets all 6 criteria of the TLAA definition in § 54.3. The lift off 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

FATIGUE *
REACTOR VESSEL NEUTRON EMBRITTLEMENT*
ENVIRONMENTAL AGING (ENVIRONMENTAL QUALIFICATION) *
LOSS OF PRESTRESS IN CONCRETE CONTAINMENT TENDONS *
HIGH DENSITY POISONS OF SPENT FUEL RACKS *
METAL CORROSION ALLOWANCE
INSERVICE FLAW GROWTH ANALYSES THAT DEMONSTRATE STRUCTURAL STABILITY FOR 40 YEARS
INSERVICE LOCAL METAL CONTAINMENT CORROSION ANALYSES
HIGH-ENERGY LINE-BREAK POSTULATION BASED ON FATIGUE CUMULATIVE USAGE FACTOR

All but one (high density poisons of spent fuel racks) of the TLAAs in this Table are cited in the SOC for the final Rule (see Appendix A of this guideline). The TLAA's with an \* have been identified based on plant-specific reviews.

5.2 Exemptions

Part 54 Reference

§54.21(c)(2)

*(2) 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 time-limited aging analyses.

Identification of an exemption may require the review of a series of correspondence between the NRC and plant to trace the resolution of the exemption. Many plants have licensing commitment tracking systems or databases of information on licensing documents available. As an alternate method or as a verification to the search, the NRC docket file in the Public Document Room (PDR) 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 period of extended operation, involves a system, structure, or component within the scope of the Rule, and involves a time-limited aging analysis issue. If all of these conditions apply, then an evaluation of the exemption must be performed. The TLAA within the exemption is reevaluated using the guidance in Section 5.1

The scope of the exemption, the analysis that forms the basis for the exemption, and the affected structure(s) or component(s) and/or the time-limited aging analysis issue 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 affect 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 time-limited aging analysis for the period of extended operation. The evaluation of the associated TLAA issue may provide sufficient justification to continue the exemption.

**5.3 Documenting the Evaluation of the Time Limited Aging Analyses 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 time-limited aging analyses 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 time-limited aging analyses and exemptions evaluation.

The information to be documented by the applicant should include:

- A list of the time-limited aging analyses 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.
- 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 6.0.

6.0 **RENEWAL OPERATING LICENSE APPLICATION FORMAT AND**  
**CONTENT**

A sample application format is presented in Table 6.0-1. Contents of the application are divided into two parts. (1) general information required by §54.17 and §54.19 and (2) technical information required by §54.21, §54.22, and §54.23. As presented, the general information is the formal part of the application with the technical information being attached as Exhibits. The Exhibits are presented in the same order that they appear in the license renewal rule application.

**TABLE 6.0-1  
SAMPLE APPLICATION FORMAT**

**GENERAL INFORMATION (§54.17, .19)**

1. Name of Applicant (§50.33(a))
2. Address of Applicant (§50.33(b))
3. Description of Business or Occupation of Applicant (§50.33(c))
4. Organization and Management of Applicant (§50.33(d)) [address also §54.17 (b)]
5. Class of License Applied for, the use to which the facility will be put, the period of time for which the license is sought (§50.33(e))
6. Earliest and latest dates for alterations, if proposed (§50.33(h))
7. Listing of regulatory agencies having jurisdiction and appropriate news publications (§50.33(i))
8. Conforming changes to the standard indemnity agreement (§54.19 (b))
9. Restricted Data Agreement (§54.17 (f, g))
10. Reference to Exhibits A, B, C, and D

**EXHIBIT A - TECHNICAL INFORMATION (§54.21 (a)-(c))**

**1.0 Introduction**

- 1.1 Scope
- 1.2 CLB changes during NRC review [§54.21(b)]
- 1.3 Time Limited Aging Analysis Evaluation [§54.21(c)]
  - 1.3.1 TLAA [identification & resolution]
  - 1.3.2 Exemptions [identification & resolution]

**2.0 Integrated Plant Assessment - Structure/Component Identification (§ 54.21 (a)(1) - (2))**

- 2.1 Introduction
- 2.2 Structure/Component Selection Process
- 2.3 List and identify results per §54.21(a)(1)

**3.0 Integrated Plant Assessment - Aging Management Review (§ 54.21 (a)(3))**

- 3.1 Introduction
- 3.2 Aging Management Review Process

**EXHIBIT B - FSAR SUPPLEMENT (§54.21 (d))**

**EXHIBIT C - TECHNICAL SPECIFICATIONS (§54.22)**

**EXHIBIT D - ENVIRONMENTAL INFORMATION (§54.23)(§50.53(c))**

6.1           **Formal Application**

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 license renewal 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
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.*
10. Reference to Exhibits A, B, C, and D

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

1     **6.2           Exhibit A - Technical Information**

2  
3     Exhibit A of the renewal application contains the technical information that the NRC staff  
4     will review to determine if the effects of aging on certain long-lived passive structures  
5     and components are being managed such that the associated intended function(s) is  
6     maintained consistent with the CLB in the period of extended operation. The Technical  
7     Information provided in Exhibit A must be of sufficient detail in order that the NRC may  
8     make the finding that there is reasonable assurance that the activities authorized by the  
9     renewal license will continue to be in accordance with the CLB (§54.29(b)).

10  
11    The application should contain clear and concise presentations of the required  
12    information. Confusing or ambiguous statements and unnecessarily verbose descriptions  
13    do not contribute to expeditious technical review. Claims of adequacy of aging  
14    management review should be supported by technical bases. The level of detail contained  
15    in the application should be commensurate with the level of detail typically contained in  
16    responses to regulations, license amendment requests, and NRC generic communications  
17    submitted on the licensee docket.

18  
19    The information contained in the application is based on the information contained in  
20    plant specific documentation as previously described in Sections 3.3, 4.3, and 5.3 of this  
21    guideline. However, detailed procedures/calculations need not be included in the license  
22    renewal application

23  
24    The contents of this portion of the application parallel the requirements stated in §54.21  
25    (a)-(c). Once the Renewal Operating License is issued by the NRC, this exhibit of the  
26    application is a licensing historical document and is not required to be updated.

27  
28    The information provided in Exhibit A will provide the basis of the changes made to both  
29    the FSAR and the Technical Specifications. The FSAR Supplement and the Technical  
30    Specifications changes are provided in Exhibits B and C, respectively.

31  
32    Exhibit A is organized into three sections or chapters: Introduction, Integrated Plant  
33    Assessment - Structure and Component Selection, and Integrated Plant Assessment -  
34    Aging Management Review. Guidance on each of these chapters is provided in the  
35    following subsections.

36  
37     **6.2.1           Introduction**

38  
39    The first Chapter of Exhibit A is the Introduction which includes the following  
40    subsections: Scope of Exhibit A, CLB Changes during NRC review, and Time Limited  
41    Aging Analysis Evaluations.

1 The subsection Scope of Exhibit A identifies that Exhibit A will address requirements  
2 from §54.21 (a) - (c).

3  
4 **6.2.1.1 Identify CLB Changes**

5  
6  
7 **Part 54 Reference**

8 **§54.21(b)**

9 *CLB changes during NRC review of application. Each year following submittal of the*  
10 *license renewal application and at least 3 months before scheduled completion of the*  
11 *NRC review, an amendment to the renewal application must be submitted that identifies*  
12 *any change to the CLB of the facility that materially affects the contents of the license*  
13 *renewal application, including the FSAR supplement.*  
14

15  
16 The Rule requires that the application be updated yearly and at least three months before  
17 scheduled completion of the NRC review, to identify any changes to the facility's current  
18 licensing basis that materially affect the application. These changes are provided to the  
19 NRC in the form of an amendment to the license renewal application. For the initial  
20 renewal application submittal, this provision does not apply. It is a place holder.

21  
22 The CLB Changes subsection will contain any CLB changes that occur during NRC  
23 review of the application that materially affect the contents of the license renewal  
24 application including the FSAR supplement.

25  
26 **6.2.1.2 Time Limited Aging Analysis Evaluations**

27  
28 The Time-Limited Aging Analyses subsection provides the information required by  
29 §54.21(c).

30  
31 The application shall include a list of time-limited aging analyses, as defined by §54.3.  
32 The application should include the identification of the affected systems, structures, and  
33 components, an explanation of the time dependent aspects of the calculation or analysis,  
34 and a discussion of the TLAA's impact on the associated aging effect.

35  
36 The application shall include a demonstration that (1) the analyses remain valid for the  
37 period of extended operation, (2) the analyses have been projected to the end of the  
38 period of extended operation, or (3) the effects of aging on the intended function(s) will  
39 be adequately managed for the period of extended operation.

40  
41 The identification of the results of the time limited aging analysis review, which may be  
42 provided in tabular form, may reference the section in the Integrated Plant Assessment -

1 Aging Management Review chapter where more details of the actual review and  
2 disposition (as required by §54.21(c)(1)(i)-(iii)) are located.

3  
4 Summary descriptions of the of the evaluations of TLAA's for the period of extended  
5 operation shall be included in the FSAR supplement (Exhibit B).

6  
7 The application shall include a list of plant specific exemptions granted pursuant to  
8 §50.12 and in effect that are based on TLAA's as defined in §54.3. The application shall  
9 include an evaluation that justifies the continuation of these exemptions for the period of  
10 extended operation.

11  
12 The text may reference approved topical reports or regulatory guides, as applicable.

#### 13 14 **6.2.2 Integrated Plant Assessment - Structure and Component Identification**

15  
16 The second chapter of Exhibit A contains information related to the identification of  
17 structures and components subject to an aging management review as described  
18 previously in Section 4.0 of this guideline.

19  
20 The application shall identify and list the structures, components, or commodity  
21 groupings subject to an aging management review.

22  
23 Pursuant to §54.21(a)(2), the application shall include a description and justification of  
24 the methods used to identify and list those structures and components that are within the  
25 scope of license renewal and subject to an aging management review.

26  
27 Reference may be made to approved topical reports or regulatory guides as appropriate.

#### 28 29 **6.2.3 Integrated Plant Assessment - Aging Management Review**

30  
31 The third chapter of Exhibit A contains information relative to the structure/component  
32 aging management review phase of the Integrated Plant Assessment Process (IPA) as  
33 described previously in Section 4.0 of this guideline.

34  
35 The following information on the aging management review should be included in the  
36 renewal application:

- 37
- 38 • Description of the structures and components being evaluated. Reference to previous  
39 information filed with the NRC may be made.
  - 40
  - 41 • Identification of the systems, structures, or component intended functions, as  
42 appropriate.
  - 43

1 • Identification and assessment of the aging effects (or mechanisms, if appropriate),  
2 including a description of materials of construction and service environment.  
3 Operating experience should also be considered in order to identify applicable aging  
4 effects for the structures and components.

5  
6 • Identification and description of aging management programs necessary for renewal.

7  
8 • Demonstration that aging management programs, either new, existing or enhanced,  
9 will adequately manage the effects of aging such that the intended actions will be  
10 maintained consistent with the CLB for the period of extended operation.

11  
12 Summary description of the programs and activities for managing the effects of aging  
13 shall be included in the FSAR supplement (Exhibit B) at a level of detail consistent with  
14 the current FSAR

15 The results included in Exhibit A determine and technically support the changes proposed  
16 to the FSAR in Exhibit B and the changes proposed to the plant technical specifications  
17 as contained in Exhibit C.

18  
19 Time-limited aging analyses that have been identified pursuant to §54.21(c) should be  
20 evaluated and the results may be provided with the appropriate structure or component.

6.3 Exhibit B - FSAR Supplement

Part 54 Reference

§54.21(d)

*An FSAR supplement The FSAR supplement for the facility must contain a summary description of the programs and activities for managing the effects of aging and the evaluation of time-limited aging analyses for the period of extended operation determined by paragraphs (a) and (c) of this section, respectively*

The contents of the FSAR supplement will be based on the material provided in Exhibit A. Section 54.21(d) of the Rule requires that a summary description of the programs and activities for managing the effects of aging for the period of extended operation as determined by the IPA review and the evaluation of time limited aging analyses for the period of extended operation be included in the FSAR supplement.

In some instances, summary descriptions of programs and activities already exist in the plant FSAR. The applicant may chose to incorporate these existing pages of the FSAR by reference or may choose to include them in the application for the convenience of the reader.

In addition, a brief licensing summary of the license renewal proceeding may be located in the Introduction chapter of the FSAR. The renewal license application process is historical information and the brief summary may be of assistance to future readers.

The process to review and approve this change to the plant FSAR should be the same as that which the applicant presently utilizes.

Once the Renewal Operating License is approved by the NRC, the material contained in Exhibit B should be incorporated into the FSAR. The FSAR is a living document and should be maintained in accordance with applicable regulations and plant procedures.

6.4 Exhibit C - Technical Specifications

Part 54 Reference

§54.22

*Each application must include any technical specification changes or additions necessary to manage the effects of aging during the period of extended operation as part of the renewal application. The justification for changes or additions to the technical specifications must be contained in the license renewal application.*

Exhibit C includes appropriate technical specification changes prepared and presented in a manner consistent with the way the an applicant normally submits proposed technical specification revisions. Justification may be included herein, or may reference other parts of the license renewal application. Exhibit C meets the requirements of §54.22.

Once the Renewal Operating License is issued by the NRC, the proposed changes to technical specifications will be incorporated and issued along with the renewal license. The technical specifications are in a living document and should be maintained in accordance with applicable regulations and plant procedures.

6.5 Exhibit D - Environmental Information

Part 54 Reference

§54.23

*Each application must include a supplement to the environmental report that complies with the requirements of Subpart A of 10 CFR Part 51*

When the Part 51 rulemaking is complete, it is expected that §51.53(c) will require that certain environmental impacts be addressed in the Supplement to the Environmental Report contained in the renewal license application.

The format and content of Exhibit D should be based on Supplement 1 to Regulatory Guide 4.2, "Preparation of Environmental Reports for Nuclear Power Plants". Exhibit D meets the requirements of §54.23.

Once the Renewal Operating License is issued by the NRC, the environmental information contained in Exhibit D will be maintained in accordance with applicable regulations and plant procedures.

NEI 95-10  
REVISION 0  
March 1, 1996

**APPENDIX A**

**10 CFR PART 54  
THE LICENSE RENEWAL RULE**

require the approval of OMB under 44 U.S.C. 3501, et seq.

#### Comments

A general description of the statutory basis for this final rule was set forth in the interim rule published on September 16, 1994, (59 FR 47530). The interim rule provided 60 days for comments. No comments were received during the interim rule comment period of September 16 through November 15, 1994. This final rule provides that in determining net proceeds for shorn wool or mohair, effective for 1993 and subsequent marketing years, marketing charges for commissions, coring, or grading shall not be deducted. This rule provides authorized representatives of USDA and CCC access to the premises of buyers and sellers of wool and mohair in order to inspect their records for authenticity.

This provision had been accidentally omitted when the wool regulations and mohair regulations were combined in 1991. This final rule also clarifies the definition of nonmarketing charges to make it consistent with the calculation of net proceeds and net proceeds for payment purposes.

Section 1468.18(d) was inadvertently omitted from the interim rule. This provision was accidentally omitted when the mohair regulations and the wool regulations were combined in 1991 (56 FR 40233, August 14, 1991). This final rule, in part, merely reinstates the omitted provision.

#### List of Subjects in 7 CFR Part 1468

Grant program—agriculture, Livestock, Mohair, Reporting and recordkeeping, Wool.

Accordingly, the interim rule amending 7 CFR part 1468 published on September 16, 1994, (59 FR 47530) is adopted as final with the following changes:

#### PART 1468—WOOL AND MOHAIR

1. The authority citation for 7 CFR part 1468 continues to read as follows:

Authority: 7 U.S.C. 1781–1787; 15 U.S.C. 714b and 714c.

2. In § 1468.3 the definition of “Nonmarketing charges” is revised to read as follows:

#### § 1468.3 Definitions.

**Nonmarketing charges** means charges paid by or for the account of the producer that are not directly related to improving the marketability of the shorn wool or mohair, such as, but not limited to, storage bags, advances, interest on advances, shearing, and association

dues, and are not deducted from the producer's gross proceeds to determine net proceeds for payment purposes and are deducted from gross proceeds to determine net proceeds.

3. Section 1468.18 is amended by adding paragraph (d) to read as follows.

#### § 1468.18 Maintenance and inspection of records.

(d) At all times during regular business hours, authorized representatives of CCC or USDA shall have access to the premises of the applicant, of the marketing agency, and of the person who furnished evidence to an applicant for use in connection with the application, in order to inspect, examine, and make copies of the books, records, and accounts, and other written data as specified in paragraphs (a), (b), and (c) of this section.

Signed at Washington, DC, on May 1, 1995.  
Bruce R. Weber,  
Acting Executive Vice President, Commodity Credit Corporation.  
[FR Doc. 95–71180 Filed 5–5–95, 8:45 am]  
BILLING CODE 3410–06–M

## NUCLEAR REGULATORY COMMISSION

### 10 CFR Parts 2, 51, and 54

RIN 3150–AF05

#### Nuclear Power Plant License Renewal; Revisions

AGENCY: Nuclear Regulatory Commission.

ACTION: Final rule.

**SUMMARY:** The Nuclear Regulatory Commission (NRC) has amended its regulations to revise the requirements that an applicant must meet for obtaining the renewal of a nuclear power plant operating license. The rule also clarifies the required information that must be submitted for review so that the agency can determine whether those requirements have been met and changes the administrative requirements that a holder of a renewed license must meet. These amendments are intended to provide a more stable and predictable regulatory process for license renewal.

**EFFECTIVE DATE:** June 7, 1995.

**FOR FURTHER INFORMATION CONTACT:**

James J. Hiltz, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555, telephone: (301) 415–1105.

#### SUPPLEMENTARY INFORMATION:

##### I. Background.

##### II. Final Action.

##### III. Principal Issues.

- a. Continued validity of certain find previous rulemaking.
  - b. Reaffirmation of the regulatory philosophy and approach and clarification of the two principles license renewal.
  - c. Systems, structures, and components within the scope of license renewal.
  - d. The regulatory process and aging management.
  - e. Reaffirmation of conclusions concerning the current licensing basis and maintaining the function of system structures, and components.
  - f. Integrated plant assessment.
  - g. Time-limited aging analyses and exemptions.
  - h. Standards for issuance of a renewed license and the scope of hearings.
  - i. Regulatory and administrative control.
- IV. General Comments and Responses.  
V. Public Responses to Specific Questions.  
VI. Availability of Documents.  
VII. Finding of No Significant Environmental Impact: Availability.  
VIII. Paperwork Reduction Act Statement.  
IX. Regulatory Analysis.  
X. Regulatory Flexibility Act Certification.  
XI. Non-Applicability of the Backfit Rule.

##### I. Background

The previous license renewal rule (CFR Part 54) was adopted by the Nuclear Regulatory Commission (NRC) on December 13, 1991 (56 FR 6494). This rule established the procedures, criteria, and standards governing the renewal of nuclear power plant operating licenses.

Since publishing the previous license renewal rule, the NRC staff has conducted various activities related to implementing this rule. These activities included: developing a draft regulatory guide, developing a draft standard review plan for license renewal, interacting with lead plant licensee and reviewing generic industry technical reports sponsored by the Nuclear Management and Resource Council (now part of the Nuclear Energy Institute (NEI)).

In November 1992, the law firm of Shaw, Pittman, Potts, and Trowbridge submitted a paper to the NRC that presented the perspective of the North States Power Company on the license renewal process. The paper included specific recommendations for making the license renewal process more workable. In addition, industry representatives provided the Commission with views on several license renewal implementation issues. In late 1992, the NRC staff conducted senior management review and discussed key license renewal issues with the Commission, industry groups,

and individual licensees. The NRC staff presented its recommendations regarding several of these key license renewal issues in two Commission policy papers: SECY-93-049, "Implementation of 10 CFR Part 54,"

"Requirements for Renewal of Operating Licenses for Nuclear Power Plants," and SECY-93-113, "Additional Implementation Information for 10 CFR Part 54, 'Requirements for Renewal of Operating Licenses for Nuclear Power Plants.'"

In its staff requirements memorandum (SRM) of June 28, 1993, the Commission stated that it is essential to have a predictable and stable regulatory process clearly and unequivocally defining the Commission's expectations for license renewal. This process would permit licensees to make decisions about license renewal without being influenced by a regulatory process that is perceived to be uncertain, unstable, or not clearly defined. The Commission directed the NRC staff to convene a public workshop to evaluate alternative approaches for license renewal that best take advantage of existing licensee activities and programs as a basis for concluding that aging will be addressed in an acceptable manner during the period of extended operation. In particular, the Commission directed the NRC staff to examine the extent to which greater reliance can be placed on the maintenance rule (10 CFR 50.85, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants") as a basis for concluding that the effects of aging will be effectively managed during the license renewal term.

On September 30, 1993, the NRC staff conducted a public workshop in Bethesda, Maryland, that was attended by over 180 people. Attendees included nuclear utilities, industry organizations, public interest groups, architect and engineering firms, consultants and contractors, and Federal and State governments. In December 1993, the NRC staff forwarded SECY-93-331, "License Renewal Workshop Results and Staff Proposals for Revision to 10 CFR Part 54, 'Requirements for Renewal of Operating Licenses for Nuclear Power Plants,'" to the Commission. The NRC staff recommended that the Commission amend 10 CFR Part 54.

In its SRM of February 3, 1994, the Commission agreed with the NRC staff's conceptual approach (explained in SECY-93-331) for performing license renewal reviews and directed the staff to proceed with rulemaking to amend 10 CFR Part 54. The Commission believes that the license renewal process should focus on the management of the effects

of aging on certain systems, structures, and components during the period of extended operation. An objective for the amendment is to establish a more stable and predictable license renewal process. The amendment will identify certain systems, structures, and components that require review in order to provide the necessary assurance that they will continue to perform their intended function for the period of extended operation.

On May 23, 1994, the NRC staff provided the Commission with its proposed amendment to the license renewal rule in SECY-94-140, "Proposed Amendment to the Nuclear Power Plant License Renewal Rule (10 CFR Part 54)." In the SRM of June 24, 1994, the Commission approved the publication of the proposed rule amendment for a 90-day public comment period. In the SRM, the Commission directed the staff to (1) ensure consistency in the use of the terms "structures, systems, and components" and "structures and components," (2) solicit comments on the ability of existing programs to detect failures in redundant structures and components before there is a loss of intended system or structure function, (3) address the need for § 54.4(a)(3) in the statements of consideration for the proposed rule, and (4) review the necessity of retaining § 54.4(a)(4) and include the rationale for its conclusions in the proposed rule.

On September 9, 1994, (59 FR 46574) the proposed revisions to the license renewal rule were published in the Federal Register for a 90-day public comment period. The public comment period ended on December 9, 1994. The

<sup>1</sup> Throughout the Statement of Considerations, the phrases, "systems, structures, and components" and "structures and components" are used. As a matter of clarification, the Commission intends that the phrases, "systems, structures, and components" applies to the matters involving the discussions of the overall renewal review, the specific license renewal scope (§ 54.4), time-limited aging analyses (§ 54.21(e)), and the license renewal finding (§ 54.23). The phrases, "structures and components" apply to matters involving the integrated plant assessment (IPA) required by § 54.21(a) because the aging management review required within the IPA should be a component and structural level review rather than a more general system level review. The phrase systems, structures, and components applies to the evaluation of time-limited aging analyses required by § 54.21(c) because such plant-specific analyses may have been carried out for the initial operating term, for either systems, structures, or components. Reevaluation for the renewal term is intended to focus on the same systems, structures, or components subject to the initial term time-limited aging analyses. The finding required by § 54.23 considers both the results of the integrated plant assessment and the time-limited aging analyses and therefore, the phrase systems, structures, and components is applicable to this section.

Commission received 42 separate responses concerning the proposed rulemaking for license renewal. In early April 1995, after reviewing SECY-95-067, "Final Amendment to the Nuclear Power Plant License Renewal Rule (10 CFR Part 54)," the Nuclear Energy Institute and Yankee Atomic Electric Company provided additional comments. All comments received have been considered in developing this final rule.

Comments on the proposed rule came from a variety of sources. These included: a private citizen, 3 public interest groups (Sierra Club—Atlantic Chapter, Public Citizen, and the Ohio Citizens for Responsible Energy Inc.), 1 Federal organization (Department of Energy (DOE)), 4 State organizations (Illinois Department of Nuclear Safety (Illinois), Connecticut Department of Public Utility Control (Connecticut), New Jersey Department of Environmental Protection (New Jersey), and Nevada Agency for Nuclear Projects, Nuclear Waste Project Office (Nevada)), 2 industry organizations (NEI and Nuclear Utility Group on Equipment Qualification (NUGEQ)), 2 vendor owners groups (Babcock and Wilcox (B & W) Owners Group and Westinghouse Owners Group), 2 vendors/consultants (B & W Nuclear Technologies and Westinghouse Electric Corporation), and 27 separate nuclear power plant licensees. All 27 licensees endorsed the comments provided by NEI and some utilities also provided additional comments.

The Commission specifically solicited responses to five questions in the proposed rule. The questions and the responses to them can be found in Section V of the Supplementary Information also known as the Statement of Considerations (SOC).

Many of the letters contained similar comments, which were grouped together and are addressed on an issue basis. The NRC has responded to all of the significant points raised by the commenters. Those comments that are applicable to a specific issue discussed in a specific section of the Supplementary Information portion of this document are discussed within that section. Comments received that are not responsive to a particular issue are addressed in Section IV. Public comments received on the proposed rule are available for inspection and copying for a fee at the Commission's Public Document Room located at 2120 L Street NW, (Lower Level), Washington, DC.

## II. Final Action

The final rule revises certain requirements contained in 10 CFR Part 54 and establishes a regulatory process that is simpler, more stable, and more predictable than the previous license renewal rule. The final rule continues to ensure that continued operation beyond the term of the original operating license will not be inimical to the public health and safety. The more significant changes made to the previous license renewal rule are as follows:

(1) The intent of the license renewal review has been clarified to focus on the adverse effects of aging rather than identification of all aging mechanisms. The final rule is intended to ensure that important systems, structures, and components will continue to perform their intended function in the period of extended operation. Identification of individual aging mechanisms is not required as part of the license renewal review. The definitions of age-related degradation, age-related degradation unique to license renewal, aging mechanisms, renewal term, and effective program have been deleted.

(2) The definitions of integrated plant assessment (IPA) (§ 54.3) and the IPA process (§ 54.21(a)) have been clarified to be consistent with the revised focus in item (1) on the detrimental effects of aging.

(3) A new § 54.4 has been added to replace the definition of systems, structures, and components "important to license renewal" in § 54.3. Section 54.4 defines those systems, structures, and components within the scope of the license renewal rule and identifies the important functions (intended functions) that must be maintained. The requirement to include systems, structures, and components that have limiting conditions for operation in facility technical specifications within the scope of license renewal has been deleted.

(4) In § 54.21(a), the IPA process has been simplified. The wording has been changed to resolve any ambiguity associated with the use of the terms systems, structures, and components (SSCs) and structures and components (SCs). A simplified methodology for determining whether a structure or component requires an aging management review for license renewal has been delineated. Only passive, long-lived structures and components are subject to an aging management review for license renewal. Sections 54.21 (b) and (d) have been deleted, and a new § 54.21(c) dealing with time-limited aging analyses (TLAA) and § 54.21(d) dealing with requirements for the final

safety analysis report (FSAR) supplement have been added. The requirement in § 54.21(c) of the previous rule to review any relief from codes and standards has been deleted, and the requirement in § 54.21(c) of the previous rule to review exemptions from regulatory requirements has been clarified and linked with the time-limited aging analyses.

(5) In § 54.22, the requirement to include detailed justification for certain technical specification changes in the FSAR supplement has been modified to require that the detailed justification be included in the license renewal application.

(6) In § 54.29, the standards for issuance of a renewed license have been changed to reflect the revised focus on the detrimental effects of aging concerning structures and components requiring an aging management review for license renewal and any time-limited issues (including exemptions) applicable for the renewal term. A new § 54.30 has been added to distinguish between those issues identified during the license renewal process that require resolution during the license renewal process and those issues that require resolution during the current license term.

(7) In § 54.33, requirements for continuation of the current licensing basis (CLB) and conditions of renewed licenses have been changed to delete all reference to age-related degradation unique to license renewal (ARDUTLR). Section 54.33(d) of the previous rule, which requires a specific change control process, has been deleted.

(8) In § 54.37, additional records and recordkeeping requirements have been changed to be less prescriptive. Section 54.37(c) has been deleted.

## III. Principal Issues

### a. Continued Validity of Certain Findings in Previous Rulemaking

The principal purpose of this final rule is to simplify and clarify the previous license renewal rule. Unless otherwise clarified or reevaluated, either directly or indirectly, in the discussion for this final rule, the conclusions in the SOC for the previous license renewal rule remain valid (56 FR 64943; December 13, 1991).

One commenter stated that the previous license renewal rule has been substantially modified in the proposed rule so as to constitute a "recision" of the previous rule.

The Commission does not believe that this final rule represents a recision of the previous license renewal rule, 10 CFR Part 54. As stated in the SOC for

the proposed rule, "[u]nless otherwise clarified or reevaluated, either directly or indirectly, in the discussion for proposed rule, the conclusions in the SOC for the current license renewal remain valid \* \* \* September 9, (59 FR 46576). Some of the subject resolved in the previous Part 54 rulemaking that remain unaffected this final rule include the concept of CLB, the nature of the current regulatory process, the regulatory process for assuring compliance with the CLB of the renewed license, the term of renewed license, antitrust considerations, and the applicability of the provisions of the Price-Anderson Act.

Furthermore, regardless of whether this final rule constitutes a recision of the previous rule, the Commission agrees with the commenter that the Administrative Procedure Act (APA) requires the Commission to provide "reasoned analysis" for the change Part 54 that are being adopted in the final rule. The Commission takes issue with the commenter with regard to whether the SOC for the proposed rule for the final rule adequately explains the bases for the changes. The Commission believes that this SOC provides a detailed discussion setting forth the perceived problems with the previous license renewal rule as well as a discussion of the bases for this final rule. In sum, the Commission has fulfilled its obligation under the APA to provide the bases for this rule, regardless of whether the changes are being adopted in this final rule constitute a recision of the previous license renewal rule.

### b. Reaffirmation of the Regulatory Philosophy and Approach and Clarification of the Two Principles License Renewal

#### (i) Regulatory Philosophy

In developing the previous license renewal rule, the Commission concluded that issues material to the renewal of a nuclear power plant operating license are to be confined to those issues that the Commission determines are uniquely relevant to protecting the public health and safety and preserving common defense or security during the period of extended operation. Other issues would, by definition, have a relevance to the health and safety of the public during current plant operation. Given the Commission's ongoing obligation to oversee the safety and security of operating reactors, issues that are relevant to current plant operation be addressed by the existing regula-

process within the present license term rather than deferred until the time of license renewal. Consequently, the Commission formulated two principles of license renewal.

The first principle of license renewal was that, with the exception of age-related degradation unique to license renewal and possibly a few other issues related to safety only during the period of extended operation of nuclear power plants, the regulatory process is adequate to ensure that the licensing bases of all currently operating plants provides and maintains an acceptable level of safety so that operation will not be inimical to public health and safety or common defense and security. Moreover, consideration of the range of issues relevant only to extended operation led the Commission to conclude that the detrimental effects of aging is probably the only issue generally applicable to all plants. As a result, continuing this regulatory process in the future will ensure that this principle remains valid during any period of extended operation if the regulatory process is modified to address age-related degradation that is of unique relevance to license renewal. Consequently, the previous license renewal rule focused the Commission's review on this one safety issue.

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 principle would be accomplished, in part, through a program of age-related degradation management for systems, structures, and components that are important to license renewal as defined in the previous rule.

The Commission still believes that mitigation of the detrimental effects of aging resulting from operation beyond the initial license term should be the focus for license renewal. After further consideration and experience in implementing the previous rule, the Commission has, however, determined that the requirements for carrying out the license renewal review can and should be simplified and clarified. The Commission has concluded that, for certain plant systems, structures, and components, the existing regulatory process will continue to mitigate the effects of aging to provide an acceptable level of safety in the period of extended operation.

The objective of a license renewal review is to determine whether the detrimental effects of aging, which could adversely affect the functionality

of systems, structures, and components that the Commission determines require review for the period of extended operation, are adequately managed. The license renewal review is intended to identify any additional actions that will be needed to maintain the functionality of the systems, structures, and components in the period of extended operation. The Commission has determined that it can generically exclude from the IPA aging management review for license renewal (1) those structures and components that perform active functions and (2) structures and components that are replaced based on qualified life or specified time period. However, all systems, structures, and components evaluated based on time-limited aging analyses would be subject to a license renewal evaluation. Structures or components may have active functions, passive functions, or both. Detailed discussions concerning determination of those systems, structures, and components requiring a license renewal review are contained in Section III.c of this SOC; detailed discussions of those structures and components subject to an aging management review are in Section III.f of this SOC, and detailed discussions of systems, structures, and components requiring a license renewal evaluation are contained in Section III.g of this SOC.

This final rule focuses the license renewal review on certain systems, structures, and components that the Commission has determined require evaluation to ensure that the effects of aging will be adequately managed in the period of extended operation. This change is viewed as a modification consistent with the first principle of license renewal established in the previous rule. In view of this final rule, the first principle can be revised to state that, with the possible exception of the detrimental effects of aging on the functionality of certain plant systems, structures, and components in the period of extended operation and possibly a few other issues related to safety only during extended operation, the regulatory process is adequate to ensure that the licensing bases of all currently operating plants provides and maintains an acceptable level of safety so that operation will not be inimical to public health and safety or common defense and security. As modified, the Commission affirms its support of the first principle of license renewal, as well as the (unmodified) second principle

(iii) Deletion of the term "Age-Related Degradation Unique to License Renewal"

The use of the term "age-related degradation unique to license renewal" in the previous license renewal rule caused significant uncertainty and difficulty in implementing the rule. A key problem involved how "unique" aging issues were to be identified and, in particular, how existing licensee activities and Commission regulatory activities would be considered in the identification of systems, structures, and components as either subject to or not subject to ARDUTLR. The difficulty in clearly establishing "uniqueness" in connection with the effects of aging is underscored by the fact that aging is a continuing process, the fact that many licensee programs and regulatory activities are already focused on mitigating the effects of aging to ensure safety in the current operating term of the plant, and the fact that no new aging phenomena have been identified as potentially occurring only during the period of extended operation.

The final rule eliminates both the definition of ARDUTLR and use of the term in codified regulatory text. Thus, confusion regarding the detailed definition of ARDUTLR in the rule and questions regarding which structures and components could be subject to ARDUTLR have been eliminated.

Public Citizen noted that deletion of the term ARDUTLR represents alteration of the "original premise" of the rule and this change "has not been precipitated by any realization about reactor aging and safety." Under both the previous renewal rule as well as this final rule, the objective was to supplement the regulatory process, if warranted, to provide sufficient assurance that adequate safety will be assured during the extended period of operation. The Commission has concluded that the only issue where the regulatory process may not adequately maintain a plant's current licensing basis concerns the detrimental effects of aging on the functionality of certain systems, structures, and components in the period of extended operation. While the objective and conclusion has remained the same in the two rulemakings, the first principle of license renewal has been revised consistent with the deletion of ARDUTLR. The Commission recognizes that the concept of ARDUTLR has been removed inasmuch as the term "ARDUTLR" has been deleted from the first principle and from the rule language itself. However, consistent with the focus of the previous rule, the final rule will ensure that the

effects of aging in the period of extended operation are adequately managed.

The Commission disagrees with the commenter's statement that this change was arrived at without regard to reactor aging and safety. As discussed above, greater understanding that (1) aging is a continuous process and (2) that the actual effects of aging are not explicitly linked, from a technical perspective, to the term of an operating license, led the Commission to consider deleting ARDUTLR. The Commission's current determination that a narrower set of systems, structures, and components than that of the previous license renewal rule should require evaluation to ensure that the effects of aging will be adequately managed in the period of extended operation recognizes that many licensee programs and regulatory activities will continue to adequately manage the adverse effects of aging during the period of extended operation. Therefore, the Commission believes that this alteration is firmly based on an appropriate consideration of reactor safety and aging. The final rule reflects a greater understanding of effective aging management (focus on effects rather than mechanisms) and more realistic expectations of aging in the extended period of operation.

*c. Systems, Structures, and Components Within the Scope of License Renewal*

*(i) Scope of the License Renewal Review and Elimination of the Technical Specification Limiting Conditions for Operation Scoping Category*

In the final rule, the Commission has deleted the definition (in § 54.3) of systems, structures, and components important to license renewal and replaced it with a new section entitled § 54.4 Scope. This new section continues to define the set of plant systems, structures, and components that would be the initial focus of a license renewal review. From this set of systems, structures, and components, a license renewal applicant will determine those systems, structures, and components that require review for license renewal. The intent of the definition of systems, structures, and components important to license renewal (i.e., to initially focus the review on important systems, structures, and components) remains intact in the new § 54.4.

In the SOC for the previous license renewal rule, the Commission concluded that applicants for license renewal should focus on the management of aging for those systems, structures, and components that are of

principal importance to the safety of the plant. The Commission also believed that the focus of an aging evaluation for license renewal cannot be limited to only those systems, structures, and components that the Commission has traditionally defined as safety-related. Therefore, the Commission determined that, in order to ensure the continued safe operation of the plant during the renewal term, the initial focus of license renewal should be (1) safety-related systems, structures, and components, (2) nonsafety-related systems, structures, and components that directly support the function of a safety-related system, structure, or component or whose failure could prevent the performance of a required function of a safety-related system, structure, or component, (3) systems, structures, and components relied upon to meet a specific set of Commission regulations, and (4) systems, structures, and components subject to the operability requirements contained in the facility technical specification limiting conditions for operation.

Since publishing the previous rule, the Commission has gained considerable preapplication rule implementation experience and gained a better understanding of aging management, in part, through the development of a regulatory guide to implement the maintenance rule, 10 CFR 50.65. The Commission now believes that (1) by appropriately crediting existing licensee programs that manage the effects of aging and (2) by appropriately crediting the continuing regulatory process, it can more narrowly define those systems, structures, and components within the scope of license renewal and more narrowly focus the license renewal review.

The Commission continues to believe that the initial scope for the license renewal review should not be limited to only those systems, structures, or components that the Commission has traditionally defined as safety-related. However, as discussed below (see Justification for the Elimination of the Technical Specification Limiting Conditions for Operation Scoping Category) the Commission determined that the requirement to consider additional systems, structures, and components subject to the operability requirements contained in the facility technical specification limiting conditions for operation is unnecessary and has been deleted.

The first two categories of systems, structures, and components discussed in the new scope section (§ 54.4(a)(1) and (a)(2)) are the same categories defined in the previous definition of

systems, structures, and components important to license renewal. These scoping categories concern (1) all safety-related systems, structures, and components and (2) all nonsafety-related systems, structures, and components that support the function of a safety-related system, structure, or component or whose failure could prevent a safety-related system, structure, or component from satisfactorily fulfilling its intended function(s). These two categories are meant to capture, as a minimum, automatic reactor shutdown systems, engineered safety feature systems, systems required for safe shutdown (achieve and maintain the reactor in a safe shutdown condition), and nonsafety-related systems, such as auxiliary systems, necessary for the function of safety-related systems.

The third category of systems, structures, and components discussed in the new scope section (§ 54.4(a)(3)) are those systems, structures, and components whose functionality may be relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for 10 CFR 50.48 (Fire Protection), 10 CFR 50.49 (Environmental Qualification), 10 CFR 50.61 (Pressurized Thermal Shock), 10 CFR 50.62 (Anticipated Transients Without Scram), and 10 CFR 50.63 (Station Blackout). This category is also specified in the previous definition of systems, structures, and components important to license renewal and included those systems, structures, and components relied upon to meet certain regulations. This category was developed to ensure that important systems, structures, and components that may be considered outside the traditional definition of safety-related and outside of the first two categories in § 54.4, would be included within the initial focus of license renewal. Through evaluation of industry operating experience and through continuing regulatory analysis, the Commission has reaffirmed that systems, structures, and components required to comply with these regulations are important to safe plant operation because they provide substantial additional protection to the public health and safety or are an important element in providing adequate protection to the public health and safety. The Commission, therefore, concludes that these systems, structures, and components should be included as part of the initial scope of the license renewal review.

In their comments on the proposed revision to the rule, NUCREG noted that there is substantial overlap between the

equipment that would be identified in § 54.4(a) and the electrical equipment important to safety identified in § 50.49(b). To provide clarity and consistency and minimize the potential that a licensee will be required to reassess the entire scope of § 50.49 equipment, NUGEQ suggests that § 54.4(a)(3) be modified to include only the additional electric equipment identified in § 50.49(b)(3). The Commission concludes that the rule modification proposed by NUGEQ is not necessary. However, 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.

#### Justification for the Elimination of the Technical Specification Limiting Conditions for Operation Scoping Category

In the previous license renewal rule, the Commission established a fourth category of systems, structures, and components to be the focus of the initial license renewal review. In this category, the Commission included all systems, structures, and components that have operability requirements in the plant technical specifications limiting conditions for operation. As defined in Standard Technical Specifications, "a system, subsystem, train, component, or device shall be operable when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s)." This was intended to include (1) all systems, structures, and components specifically identified in the technical specification limiting conditions for operation, (2) any system, structure or component for which a functional requirement is specifically identified in the technical specification limiting conditions for operation, and (3) any necessary supporting system, structure or component that must be operable or have operability in order for a required system, structure, or component to be operable.

The Commission previously considered the technical specification

limiting conditions for operation scoping category to be consistent with the Commission's intent not to re-examine the entire plant for license renewal but to ensure that all systems, structures, and components of principal importance to safe plant operation were identified and, if necessary, evaluated. However, existing technical specifications for many plants have functional requirements on certain systems, structures, and components with low or indirect safety significance. Preapplication rule implementation experience has indicated that this category of systems, structures, and components, as defined in the previous rule, could lead to an unwarranted re-examination of plant systems, structures, and components that are not of principal importance for license renewal.

For example, limiting conditions for operation are frequently included in technical specifications for plant meteorological and seismic monitoring instrumentation, main turbine bypass systems, and traversing incore probes. These requirements, while important for certain aspects of power plant operation, have little or no direct bearing on protection of public health and safety. Recognizing this, the Commission concludes that current activities for such systems, structures, and components, including licensee programs and the NRC regulatory process, are sufficient and that no additional evaluation is necessary for license renewal. The technical specification category would only add (i.e., not captured by § 54.4(a)(1)-(3)) nonsafety-related systems, structures, and components that do not support safety-related systems, structures, and components. As discussed in greater detail below, the Commission concludes that these additional nonsafety-related systems, structures, and components should not be the subject of license renewal.

#### Relationship Between Improved Technical Specifications and License Renewal Scoping

While it is not the Commission's intent to require applicants for license renewal to "improve" their technical specifications, it remains the Commission's intent to focus the license renewal review on those systems, structures, and components that are of principal importance to safety. Therefore, a license renewal scoping category that requires wholesale consideration of systems, structures, and components within the scope of technical specifications may not appropriately focus licensee and NRC

resources on those systems, structures, and components that are of principal importance to safety.

In its "Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors" (58 FR 39132, July 22, 1993), the Commission identified four criteria for defining the scope of improved technical specifications. The four criteria are as follows:

**Criterion 1:** Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

**Criterion 2:** A process variable, design feature, or operating restriction that is an initial condition of a Design Basis Accident or Transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

**Criterion 3:** A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a Design Basis Accident or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

**Criterion 4:** A structure, system, or component which operating experience or probabilistic safety assessment has shown to be significant to public health and safety.

Nuclear power plant licensees that voluntarily choose to "improve" their technical specifications based on this Commission policy may submit changes to the Commission for review and approval that will remove systems, structures, and components from their technical specifications before conducting license renewal (experience shows that approximately 40 percent of limiting conditions for operation and surveillance requirements could be deleted).

After considering the substantial overlap between the four criteria for defining the scope of technical specifications and the first three scoping categories for license renewal, the Commission concluded that the number of additional systems, structures, and components that would be considered as a result of applying the technical specification scoping category to improved technical specifications is small. These additional systems, structures, and components most likely would result from differences in each plant's current licensing basis and from the application of these criteria and categories on a plant-specific basis.

The Commission cannot make conclusions in this rulemaking about the appropriateness of whether these

additional systems, structures, and components should be included in an individual plant's technical specifications. However, the Commission can conclude that these additional systems, structures, and components are of a relatively lower safety significance because they are, by exclusion, nonsafety-related systems, structures, and components whose failure cannot prevent the performance or reduce the availability of a safety-related system, structure, or component. Additionally, the Commission believes that the existing regulatory process for these additional nonsafety-related systems, structures, and components is adequate to ensure that age degradation will not result in a loss of functionality in accordance with the CLB.

The Commission believes that there is sufficient experience with its policy on technical specifications to apply that policy generically in revising the license renewal rule consistent with the Commission's desire to credit existing regulatory programs. Therefore, the Commission concludes that the technical specification limiting conditions for operation scoping category is unwarranted and has deleted the requirement that identifies systems, structures, and components with operability requirements in technical specifications as being within the scope of the license renewal review.

#### (ii) Intended Function

The previous license renewal rule required an applicant for license renewal to identify, from systems, structures, and components important to license renewal, those structures and components that contribute to the performance of a "required function" or could, if they fail, prevent systems, structures, and components from performing a "required function." This requirement initially posed some difficulty in conducting pre-application reviews of proposed scoping methodologies because it was not clear what was meant by "required function." Most systems, structures, and components have more than one function and each could be regarded as "required." Although the Commission could have required a licensee to ensure all functions of a system, structure, or component as part of the aging management review, the Commission concluded that this requirement would be unreasonable and inconsistent with the Commission's original intent to focus only on those systems, structures, and components of primary importance to safety. Consideration of ancillary functions would expand the scope of the license renewal review beyond the

Commission's intent. Therefore, the Commission determined that "required function" in the previous license renewal rule refers to those functions that are responsible for causing the systems, structures, and components to be considered important to license renewal.

To avoid any confusion with the previous rule, the Commission has changed the term "required function" to "intended function" and explicitly stated in § 54.4 that the intended functions for systems, structures, and components are the same functions that define the systems, structures, and components as being within the scope of the final rule.

#### (iii) Bounding the Scope of Review

Pre-application rule implementation has indicated that the description of systems, structures, and components subject to review for license renewal could be broadly interpreted and result in an unnecessary expansion of the review. To limit this possibility for the scoping category relating to nonsafety-related systems, structures, and components, the Commission intends this nonsafety-related category (§ 54.4(a)(2)) to apply to systems, structures, and components whose failure would prevent the accomplishment of an intended function of a safety-related system, structure, and component. An applicant for license renewal should rely on the plant's CLB, actual plant-specific experience, industry-wide operating experience, as appropriate, and existing engineering evaluations to determine those nonsafety-related systems, structures, and components that are the initial focus of the license renewal review. 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.

Likewise, to limit the potential for unnecessary expansion of the review for the scoping category concerning those systems, structures, and components whose function is relied upon in certain plant safety analyses to demonstrate compliance with the Commission regulations (i.e., environmental qualification, station blackout, anticipated transient without scram, pressurized thermal shock, and fire protection), the Commission intends that this scoping category include all systems, structures, and components whose function is relied upon to demonstrate compliance with these Commission's regulations. An applicant for license renewal should rely on the plant's current licensing bases, actual

plant-specific experience, industry-wide operating experience, as appropriate, and existing engineering evaluations to determine those systems, structures, and components that are the initial focus of the license renewal review. Consideration of hypothetical failures that could result from system interdependencies, that are not part of the current licensing bases and that have not been previously experienced not required.

Several commenters noted that the word "directly" did not precede the phrase "prevent satisfactory accomplishment of any of the function identified in paragraphs (a)(1)(i), (ii), c (iii) of this section" in § 54.4(a)(2) and concluded that, in the absence of the word "directly," the license renewal review could cascade into a review of second-, third-, or fourth-level support systems. The Commission reaffirms its position that 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. However, for some license renewal applicants, the Commission cannot exclude the possibility that hypothetical failures that are part of the CLB may require consideration of second-, third-, or fourth-level support systems. In these cases the word "directly" may cause additional confusion, not clarity, regarding the systems, structures and components required to be within the scope of license renewal. In removing the word "directly" from this scoping criterion, the Commission believes it has (1) achieved greater consistency between the scope of the license renewal rule and the scope of the maintenance rule (§ 50.65) regarding nonsafety-related systems whose failure could prevent satisfactory accomplishment of safety-related functions and thus (2) promote greater efficiency and predictability in the license renewal scoping process.

The inclusion of nonsafety-related systems, structures, and components whose failure could prevent other systems, structures, and components from accomplishing a safety function is intended to provide protection against safety function failure in cases where the safety-related structure or component is not itself impaired by age related degradation but is vulnerable to failure from the failure of another structure or component that may be so impaired. Although it may be considered outside the scope of the maintenance rule, the Commission intends to include equipment that is not seismically qualified located near seismically qualified equipment that is

Seismic E/L equipment already identified in a plant CLB) in this set of nonsafety-related systems, structures and components.

In one of its comments, the Sierra Club indicated that all nonsafety-related equipment and required functions should be considered because failures could go unnoticed for a long period of time and start a chain reaction that could lead to catastrophic events. Nevada also proposed a fuel life-cycle approach to license renewal that would consider the plant operations as an "Integrated Operating System." The Commission disagrees with the Sierra Club comment and the Commission concludes that the license renewal approach proposed by Nevada would result in the consideration of issues outside the scope of this rule and result in consideration of additional systems, structures, and components that are not directly related to the safe operation of the plant for the period of extended operation. The Commission has reviewed its scoping criteria and determined that the criteria (1) reflect an appropriate consideration of the existing regulatory process, (2) properly focus the initial license renewal review on those systems, structures, and components that are most important to safety and (3) will not result in an unwarranted re-examination of the entire plant.

One commenter indicated that the scope of systems, structures, and components considered for license renewal could be further reduced by identifying and addressing the very few issues in which a plant's design must specifically consider 40 years of degradation. In one of its comments, Illinois suggested that those systems, structures and components required to mitigate a sequence leading to core damage, as determined by plant-specific probabilistic analyses, and those systems, structures, and components required to make protective action recommendations for the protection of the public, should also be included in the scope of this rulemaking.

As the commenter suggested, the Commission did consider further limiting the scope of license renewal to certain issues in a plant's design that were specifically based on a time period bounded by the current license term (40 years). As a result, the Commission explicitly identified the need to review time-limited aging analyses and incorporated this requirement into the final rule. However, as discussed in Section III.d and III.f of this SOC, the Commission determined that, at this time, there was not an adequate basis to generically exclude passive, long-lived

structures and components from an aging management review. Therefore, the Commission believes it is inappropriate to further reduce the systems, structures, and components within the scope of license renewal.

Regarding the use of probabilistic analyses in the license renewal scoping process, a separate Section III.c(iv) has been added to the SOC, to discuss the role of probabilistic risk assessment in license renewal. Regarding systems, structures, and components required to make protective action recommendations, the Commission thoroughly evaluated emergency planning considerations in the previous license renewal rulemaking. These evaluations and conclusions are still valid and can be found in the SOC for the previous license renewal rule (56 FR 64943 at 64966). Therefore, the Commission concludes that systems, structures, and components required for emergency planning, unless they meet the scoping criteria in § 54.4, should not be the focus of a license renewal review.

#### (iv) Use of Probabilistic Risk Assessment in License Renewal

Several comments from Illinois concerned the use of probabilistic analysis techniques in the license renewal process. Illinois indicated that the NRC should require rigorous probabilistic analyses, require these analyses to be used in appropriate regulatory applications, and require these probabilistic analyses to be updated, as needed. In addition, Illinois noted that the previous rule and the proposed rule did not require consideration of individual plant examination (IPE) results.

The Commission is finalizing a policy statement regarding the increased use of probabilistic risk assessment (PRA) methods in nuclear regulatory activities (59 FR 63389; December 8, 1994). However, there is currently no additional guidance for licensees to conduct more rigorous probabilistic analyses beyond the guidance for an IPE and an IPE External Events (IPEEE) (Generic Letter 88-20). The Commission's consideration of regulatory requirements associated with developing, maintaining, or using probabilistic analyses is beyond the scope of this rulemaking.

The CLB for currently operating plants is largely based on deterministic engineering criteria. Consequently, there is considerable logic in establishing license renewal scoping criteria that recognize the deterministic nature of a plant's licensing basis. Without the necessary regulatory requirements and appropriate controls for plant-specific

PRA, the Commission concludes that it is inappropriate to establish a license renewal scoping criterion, as suggested by Illinois, that relies on plant-specific probabilistic analyses. Therefore, within the construct of the final rule, PRA techniques are of very limited use for license renewal scoping.

In license renewal, probabilistic methods may be most useful, on a plant-specific basis, in helping to assess the relative importance of structures and components that are subject to an aging management review by helping to draw attention to specific vulnerabilities (e.g., results of an IPE or IPEEE). Probabilistic arguments may assist in developing an approach for aging management adequacy. However, probabilistic arguments alone will not be an acceptable basis for concluding that, for those structures and components subject to an aging management review, the effects of aging will be adequately managed in the period of extended operation.

Illinois also indicated that as probabilistic insights are more fully integrated with our traditional deterministic methods of regulation, they may define a narrower safety focus. Thus, the use of probabilistic insights could reduce the scope of the very programs that the license renewal rule credits for monitoring and identifying the effects of aging.

The Commission reaffirms its previous conclusion (see 56 FR 64943 at 64956) that PRA techniques are most valuable when they focus the traditional, deterministic-based regulations and support the defense-in-depth philosophy. In this regard, PRA methods and techniques would focus regulations and programs on those items most important to safety by eliminating unnecessary conservatism or by supporting additional regulatory requirements. PRA insights would be used to more clearly define a proper safety focus, which may be narrower or may be broader. In any case, PRA will not be used to justify poor performance in aging management or to reduce regulatory or programmatic requirements to the extent that the implementation of the regulation or program is no longer adequate to credit for monitoring or identifying the effects of aging.

#### d. The Regulatory Process and Aging Management

##### (i) Aging Mechanisms and Effects of Aging

The license renewal review approach discussed in the SOC accompanying the December 13, 1991, rule emphasized the

identification and evaluation of aging mechanisms for systems, structures, and components within the scope of the rule. Primarily through pre-application implementation experience associated with the previous license renewal rule and the evaluation of comments resulting from the September 1993 license renewal workshop, the Commission determined that an approach to license renewal that focuses only on the identification and evaluation of aging mechanisms could constitute an open-ended research project. Ultimately, this type of approach may not provide reasonable assurance that certain systems, structures, and components will continue to perform their intended functions. The Commission believes that regardless of the specific aging mechanism, only aging degradation that leads to degraded performance or condition (i.e., detrimental effects) during the period of extended operation is of principal concern for license renewal. Because the detrimental effects of aging are manifested in degraded performance or condition, an appropriate license renewal review would ensure that licensee programs adequately monitor performance or condition in a manner that allows for the timely identification and correction of degraded conditions. The Commission concludes that a shift in focus to managing the detrimental effects of aging for license renewal reviews is appropriate and will provide reasonable assurance that systems, structures, and components are capable of performing their intended function during the period of extended operation.

This shift in focus of the license renewal review has resulted in several proposed changes to the license renewal rule. These changes include deleting the definitions of aging mechanism and age-related degradation and replacing the requirement to manage ARDUTLR in the IPA with a requirement to demonstrate that the effects of aging will be adequately managed for the period of extended operation.

Illinois commented that additional research should be undertaken to ensure all aging effects are understood. Mitigating the effects of aging cannot be completely divorced from understanding the aging mechanisms. Illinois indicated that the effects of aging on a system, structure, and component cannot be managed without some consideration of all the aging mechanisms causing the effects. As some aging mechanisms are not well understood, research will still need to be performed, and the regulatory

process will still need to be adequate to address aging uncertainties.

When the Commission concluded that the proper approach for a license renewal review was one that focused on mitigating the detrimental effects of aging regardless of the mechanisms causing the effects, the intent was to concentrate efforts on identification of functional degradation; that is, except for well-understood aging mechanisms, the straightforward approach to detecting and mitigating the effects of aging begins with a process that ensures that the intended design functions of systems, structures, and components have not been compromised or degraded. Once functional degradation is identified through performance or condition monitoring, corrective actions can be applied. The Commission agrees that adverse aging effects cannot be completely divorced from an understanding of the aging mechanisms. The corrective actions that should be taken following identification of functional degradation logically include determination of the cause of the degradation, which could involve mechanisms other than aging (e.g., faulty manufacturing processes, faulty maintenance, improper operation, or personnel errors). If one or more aging mechanisms are the cause of functional degradation, corrective actions should focus, as appropriate, on prevention, elimination, or management of the effects caused by the mechanism(s) in the future. Licensees are required by current regulations to develop and implement programs that ensure that conditions adverse to quality, including degraded system, structure, and component function, are promptly identified and corrected.

#### (iii) Regulatory Requirements and Reliance on the Regulatory Process for Managing the Effects of Aging

Commercial nuclear power plants have been performing a variety of maintenance activities that function effectively as aging management programs since plants were initially constructed. The Commission also recognizes that both the industry and the NRC have acquired extensive experience and knowledge in the area of nuclear power plant maintenance. Regarding the need for a maintenance rule, the results of the Commission's maintenance team inspections (MTIs) indicated that licensees generally have adequate maintenance programs in place and have exhibited an improving trend in implementing them (56 FR 31307, July 10, 1991). However, the Commission determined that a maintenance rule was needed, in part

because the MTIs identified some common maintenance-related weaknesses, such as inadequate root-cause analysis leading to repetitive failures, lack of equipment performance trending, and lack of appropriate consideration of plant risk in the prioritization, planning, and scheduling of maintenance.

The Commission amended its regulations, at 10 CFR 50.65, on July 10, 1991 (56 FR 31306), to require commercial nuclear power plant licensees to monitor the effectiveness of maintenance activities for safety-significant plant equipment to minimize the likelihood of failures and events caused by the lack of effective maintenance. The maintenance rule and its implementing guidance (1) Provide for continued emphasis on the defense-in-depth principle by including selected balance-of-plant (BOP) systems, structures, and components, (2) integrate risk consideration into the maintenance process, (3) provide an enhanced regulatory basis for inspection and enforcement of BOP maintenance-related issues, and (4) provide a strengthened regulatory basis for ensuring that the progress achieved to date is sustained in the future. The requirements of the maintenance rule must be implemented by each licensee by July 10, 1996.

In June 1993, the NRC issued Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." The regulatory guide provides an acceptable method for complying with the requirements of the maintenance rule and states that a licensee can use alternative methods if the licensee can demonstrate that these alternative methods satisfy the requirements of the rule. Because aging is a continuing process, the Commission has concluded that existing programs and regulatory requirements that continue to be applicable in the period of extended operation and provide adequate aging management for systems, structures, and components should be credited for license renewal. Accordingly, the amendment to the license renewal rule focuses the renewal review on plant systems, structures, and components for which current activities and requirements may not be sufficient to manage the effects of aging in the period of extended operation.

Since publishing the license renewal rule on December 13, 1991, the regulatory process (e.g., regulatory requirements, aging research, inspection requirements, and inspection philosophy) for managing the detrimental effects of aging for important systems, structures, and

components has continued to evolve. The changes in the regulatory process and initial experience with the license renewal rule have had a direct bearing on the Commission's conclusions regarding the appropriate focus of aging management review for systems, structures, and components that are within the scope of the license renewal rule, and how these systems, structures, and components are treated in the IPA process.

#### (iii) Maintenance Rule Requirements and Implementation

As discussed in the regulatory analysis for the maintenance rule and in Regulatory Guide 1.160, the Commission's determination that a maintenance rule was needed arose from the conclusion that proper maintenance was essential to plant safety. A clear link exists between effective maintenance and safety as it relates to factors such as the number of transients and challenges to safety-related systems and the associated need for operability, availability, and reliability of safety-related systems, structures, and components. In addition, good maintenance is important to providing assurance that failures of other than safety-related systems, structures, and components that could initiate or adversely affect a transient or accident are minimized. Minimizing challenges to safety-related systems is consistent with the Commission's defense-in-depth philosophy. Therefore, nuclear power plant maintenance is clearly important to protecting the public health and safety.

The maintenance rule requires that power reactor licensees monitor the performance or condition of systems, structures, and components against licensee-established goals in a manner sufficient to provide reasonable assurance that these systems, structures, and components are capable of fulfilling their intended functions. Performance and condition monitoring against licensee-established goals is not required, where it can be demonstrated that the performance or condition of systems, structures, and components is being effectively controlled through the performance of appropriate preventive maintenance. Performance and condition monitoring activities and associated goals and preventive maintenance activities must be evaluated once every refueling cycle, provided the interval between evaluations does not exceed 24 months.

As discussed in Regulatory Guide 1.160, the extent of monitoring may vary from system to system, depending on the system's importance to risk. Some

monitoring at the component level may be necessary, although most of the monitoring could be done at the plant, system, or system train level. For systems, structures, and components that fall within the requirements of § 50.65(a)(1), licensees must establish goals and monitor performance against these goals. These goals should be derived from information in the CLB and should be established commensurate with safety significance of the systems, structures, or components. These goals may be performance-oriented (reliability, unavailability) or condition-oriented (pump flow, pressure, vibration, valve stroke time, current, electrical resistance). An effective preventive maintenance program is required under § 50.65(a)(2) if monitoring under § 50.65(a)(1) is not performed.

The SOC for the maintenance rule (56 FR 31308; July 10, 1991) states that the scope of § 50.65(a)(2) includes those systems, structures, and components that have "inherently high reliability" without maintenance. It is expected that many long-lived, passive structures and components could be considered inherently reliable by licensees and not be monitored under 10 CFR 50.65(a)(1). There may be few, if any, actual maintenance activities (e.g., inspection or condition monitoring) that a licensee conducts for such structures and components. Further, experience gained under the previous license renewal rule, staff review of industry reports, NRC aging research, and operating experience indicate that such structures and components should be reviewed for license renewal if they are passive and long-lived. Therefore, the Commission believes that such structures and components that are technically within the scope of the maintenance rule should not be generically excluded from review for license renewal on the basis of their inherent reliability.

Although the maintenance rule does not become effective and enforceable until July 10, 1996, the Commission believes that crediting the rule (along with the entire regulatory program) is acceptable to support managing the effects of aging for certain systems, structures, and components. As discussed in Regulatory Guide 1.160, implementation of the maintenance rule relies extensively on existing maintenance programs and activities. The industry has developed guidance for complying with the maintenance rule and the NRC staff has reviewed this guidance and found it acceptable. Many utilities are expected to follow the industry guidance in implementing the maintenance rule. Furthermore, the

failure of any licensee to comply with the maintenance rule is enforceable by the Commission after July 10, 1996.

One commenter stated that reliance on the maintenance rule is inappropriate because the NRC does not plan to scrutinize every system, structure, and component and how it is monitored in assuring compliance with the maintenance rule. According to the commenter, if there are uncertainties in the maintenance rule or its implementation, then there is uncertainty in the license renewal rule. The commenter also stated that the aging management analyses and measurements required by the license renewal rule for the period of extended operation should commence for all operating reactors when the maintenance rule goes into effect. The NRC disagrees with the commenter that the 100-percent inspection of all systems, structures, and components is necessary to verify compliance with NRC requirements, including the maintenance rule. The Commission disagrees with the commenter that the licensees should be required to commence aging management reviews required for license renewal when the maintenance rule becomes effective.

As discussed in the SOC for the previous rule (56 FR at 64951), the NRC inspection methodology utilizes a sampling technique. When problems are identified, the inspection sample size is broadened to determine the extent of the problem. Additionally, while the maintenance rule does not require licensees to submit their maintenance programs to the NRC for review and approval, compliance with the requirements of the maintenance rule will be verified through the NRC inspection process. The NRC will be conducting inspections on a routine basis onsite to verify licensee compliance with the maintenance rule. Furthermore, as discussed in Section III(d)(iv) of this SOC, the maintenance rule allows for monitoring at a train, system, or plant level, and that goals should be commensurate with safety. If performance problems arise, corrective action requirements of 10 CFR 50, Appendix B, and the maintenance rule require effective corrective actions to preclude repetition of the failure.

Passive, long-lived structures and components that are the focus of the license renewal rule are also within the requirements of the maintenance rule, as discussed in the SOC Section III(d)(iv). Treatment of these structures and components, however, under the maintenance rule is likely to involve minimal preventive maintenance or monitoring to maintain functionality of

such structures and components in the original operating period. Consequently, under the license renewal rule, the Commission did not allow for a generic exclusion of passive, long-lived structures and components based solely on maintenance activities associated with implementing the requirements of the maintenance rule. It also would be inappropriate to require that all licensees perform an aging management review required for license renewal when some licensees may not seek license renewal and do not intend to operate beyond the end of their current operating license. Furthermore, if aging issues are identified during the license renewal review that apply to the current operating term, licensees are required to take measures under their current license to ensure that the intended function of systems, structures, and components will be maintained in accordance with the CLB throughout the term of the current license. In addition, if aging issues are identified during the license renewal review that apply to the current operating term, the NRC will evaluate these issues for generic applicability as part of the regulatory process.

Therefore, the Commission believes that with the additional experience it has gained with age-related degradation reviews and with the implementation of the maintenance rule, there is a sufficient basis for concluding that current licensee programs and activities, along with the regulatory process, will be adequate to manage the effects of aging on the active functions of all systems, structures, and components within the scope of license renewal during the period of extended operation so that the CLB will be maintained. The bases for this conclusion are discussed further in the following sections.

#### (iv) Integration of the Regulatory Process and the Maintenance Rule With the License Renewal Rule

Because of the resultant insight and understanding that the NRC gained in developing the implementation guidance for the maintenance rule, the Commission is now in a position to more fully integrate the maintenance rule and the license renewal rule. Because the intent of the license renewal rule and the maintenance rule is similar (ensuring that the detrimental effects of aging on the functionality of important systems, structures, and components are effectively managed), the Commission has determined that the license renewal rule should credit existing maintenance activities and maintenance rule requirements for most structures and components. Recognition

that licensee activities associated with the implementation of the maintenance rule will continue throughout the renewal period and are consistent with the first principle of license renewal is fundamental to establishing credit for the existing program and the requirements of the maintenance rule. As a result, the requirements in this rule reflect a greater reliance on existing licensee programs that manage the detrimental effects of aging on functionality, including those activities implemented to meet the requirements of the maintenance rule.

Two commenters stated that it is inappropriate for the license renewal rule to rely on the maintenance rule implementation because 10 CFR 50.65 will not be in effect until July 10, 1996. The Commission disagrees with the commenters. As discussed in Section III.d. (ii) and (iii) of this SOC, the results of the Commission's MTIs indicate that licensees have adequate maintenance programs in place and have exhibited an improving trend in implementing them. Nuclear power plants have been performing a variety of maintenance activities since plants were initially constructed. The need for a maintenance rule arose primarily because the MTIs identified three common maintenance-related weaknesses (inadequate root-cause analysis, lack of equipment performance trending, and lack of appropriate consideration of plant risk in the prioritization, planning, and scheduling of maintenance). Additionally, the SOC for the maintenance rule (56 FR 31310) states that "[T]he focus of the rule is on the results achieved through maintenance, and, in this regard, it is not the intent of the rule that existing licensees necessarily develop new maintenance programs." Furthermore, as stated in Regulatory Guide 1.160, it is intended that activities currently being conducted by licensees, such as technical specification surveillance testing, can satisfy monitoring requirements. Such activities could be integrated with, and provide the basis for, the requisite level of monitoring. Finally, at the time of this rulemaking, nine licensees volunteered to participate in an NRC pilot inspection effort to review implementation of the maintenance rule. Five pilot inspections had been completed at nuclear power plants. The pilot inspections involved a step-by-step review of the implementation of the maintenance rule. In general, the pilot inspections found that licensees were able to utilize existing maintenance activities in complying with requirements of the

maintenance rule. Therefore, for these reasons and as discussed in Section III.d) of this SOC, the Commission continues to believe that there is a sufficient basis for concluding that current licensee programs and activities, along with the regulatory process, will be adequate to manage the effects of aging on the active functions of all systems, structures, and components within the scope of license renewal during the period of extended operation so that the CLB will be maintained.

In addition to the maintenance rule, the Commission has many individual requirements relative to maintenance throughout its regulations. These include 10 CFR 50.34(a)(3)(i); 50.34(a)(7); 50.34(b)(6)(i), (ii), (iii), and (iv); 50.34(b)(9); 50.34(f)(1)(i), (ii), (iii); 50.34(g); 50.34a(c); 50.35(a); 50.36(c)(2)(3), (5), and (7); 50.36a(a)(1); 50.49(b); 50.55a(g); Part 50, Appendix A, Criteria 1, 13, 18, 21, 32, 36, 37, 40, 43, 45, 46, 52, 53; and Part 50, Appendix B.

#### (v) Excluding Structures and Components With Active Functions

Performance and condition monitoring for systems, structures, and components typically involves functional verification, either directly or indirectly. Direct verification is practical for active functions such as pump flow, valve stroke time, or relay actuation where the parameter of concern (required function), including any design margins, can be directly measured or observed. For passive functions, the relationship between the measurable parameters and the required function is less directly verified. Passive functions, such as pressure boundary and structural integrity are generally verified indirectly, by confirmation of physical dimensions or component physical condition (e.g., piping structural integrity can be predicted based on measured wall thickness and condition of structural supports, but its seismic resistance capability cannot be verified by inspection alone). Although the requirements of the maintenance rule apply to systems, structures, and components that perform both active and passive functions, the Commission has determined that performance and condition-monitoring programs for structures and components that perform passive functions present limitations that should be considered in determining that structures and components can be generically excluded from an aging management review for license renewal.

On the basis of consideration of the effectiveness of existing programs which monitor the performance and condition of systems, structures, and components

that perform active functions, the Commission concludes that structures and components associated only with active functions can be generically excluded from a license renewal aging management review. Functional degradation resulting from the effects of aging on active functions is more readily determinable, and existing programs and requirements are expected to directly detect the effects of aging. Considerable experience has demonstrated the effectiveness of these programs and the performance-based requirements of the maintenance rule delineated in § 50.65 are expected to further enhance existing maintenance programs. For example, many licensee programs that ensure compliance with technical specifications are based on surveillance activities that monitor performance of systems, structures, and components that perform active functions. As a result of the continued applicability of existing programs and regulatory requirements, the Commission believes that active functions of systems, structures, and components will be reasonably assured in any period of extended operation. Further discussion and justification for excluding structures and components that perform active functions and are within the scope of the license renewal rule, but outside the scope of the maintenance rule, are presented in Section (vi).

One commenter argued that the Commission should not exclude active components because aging can be discontinuous, leading to catastrophic failures. Examples of catastrophic failures provided by the commenter included overstretching of metal, bending of beams, and embrittlement. In their supplemental comments, NEI and Yankee Atomic Electric Company indicated that the use of the term "portions of" could be misinterpreted and lead to an unnecessary evaluation of all passive subcomponents of active structures and components.

The commenters appear to have misunderstood the Commission's intent with regard to "active" and "passive" functions. Passive parts of structures and components that only perform active functions do not require an aging management review. Structures and components that perform both passive and active functions require an aging management review for their intended passive function only. The exclusion regarding active components is focused on active functions rather than on an exclusion of the entire component. For example, diesel generators and air compressors (excluding structural supports) perform active functions and

can be excluded from an aging management review. The examples given by the commenter for catastrophic failures are those related to "passive" intended functions (e.g., structural integrity, pressure boundary). It is the Commission's intent to include these "passive" functions in the license renewal review, irrespective of the components "active" function. For example, a safety system pump casing (i.e., pressure boundary function) would be required to be reviewed, while the pump (i.e., the active pumping function) would not. The Commission believes that considerable experience has demonstrated that its regulatory process, including the performance-based requirements of the maintenance rule, provide adequate assurance that degradation due to aging of structures and components that perform active functions will be appropriately managed to ensure their continued functionality during the period of extended operation. In addition, to address the NEI and Yankee Atomic Electric Company comments, the Commission has removed the words "portions of" and similar wording from the Statement of Considerations when it could be misinterpreted to mean a subcomponent piece-part demonstration.

A commenter argued that the Commission should not exclude from review manual valves that are rarely operated during the life of the plant, some of which are relied on as part of contingency actions in plant emergency operating procedures. The commenter argued that because these valves are rarely "officially" exercised, there is insufficient evidence that the active functions will be maintained in the renewal period. The Commission disagrees with the commenter's assertion that there is insufficient evidence that the active functions will be maintained in the renewal period. Such valves are within the scope of various regulatory programs, including the maintenance rule. Consequently, the ability of the valves to perform their intended function must be assured through either (1) effective preventive maintenance or (2) performance or condition monitoring.

#### (vi) Excluding Fire Protection Components With Active Functions

The scope of the maintenance rule does not generally include installed fire protection systems, structures, and components because performance and condition monitoring is required by § 50.48. Therefore, for the purposes of license renewal, installed structures and components that perform active functions can be generically excluded

from an aging management review because they are either within the scope of § 50.65 or § 50.48. Compliance with § 50.48 is verified through the NRC inspection program.

The fire protection rule (§ 50.48) requires each nuclear power plant licensee to have in place a fire protection plan (FPP) that satisfies 10 CFR Part 50, Appendix A, Criterion 3. Licensees are required by § 50.48 to retain the FPP and each change to the plan until the Commission terminates the reactor license. The NRC reviews each licensee's total FPP as described in the licensee's safety analysis report (SAR), using basic review guidance described in § 50.48, as applicable to each plant.

The FPP establishes the fire protection policy for the protection of systems, structures, and components important to safety at each plant and the procedures, equipment, and personnel requirements necessary to implement the program at the plant site. The FPP is the integrated effort that involves systems, structures, and components, procedures, and personnel to carry out all activities of fire protection. The FPP includes system and facility design, fire prevention, fire detection, annunciation, confinement, suppression, administrative controls, fire brigade organization, inspection and maintenance, training, quality assurance, and testing.

The FPP is part of the CLB and contains maintenance and testing criteria that provide reasonable assurance that fire protection systems, structures, and components are capable of performing their intended function. The Commission concludes that it is appropriate to allow license renewal applicants to take credit for the FPP as an existing program that manages the detrimental effects of aging. The Commission concludes that installed fire protection components that perform active functions can be generically excluded from an aging management review on the basis of performance or condition-monitoring programs afforded by the FPP that are capable of detecting and subsequently mitigating the detrimental effects of aging.

#### (vii) Future Exclusion of Structures and Components on the Basis of NRC Requirements

As part of the ongoing regulatory process, the NRC evaluates emerging technical issues and, when warranted, establishes new or revised regulatory requirements as part of the resolution of a new technical issue, subject to the provisions of the backfit rule (§ 50.109). Increasing experience with aging

nuclear power plants has led to the imposition or consideration of additional requirements. For example, at this time the Commission is considering rulemaking activities associated with steam generator performance and containment inspections. For steam generators, the Commission is considering the need for a performance-based rule to address steam generator tube integrity. To address concerns regarding containments and liners, the Commission is considering amending § 50.55(a) to incorporate the most recent version of Subsections IWE and IWL in the American Society of Mechanical Engineers (ASME) Code, Section XI.

These new requirements, if implemented, would be relevant to both aging management and the structures and components subject to an aging management review for license renewal (i.e., passive, long-lived structures and components). As a result, as part of relevant future rulemakings, the Commission intends to evaluate whether these new requirements can be considered effective in continuing to manage the effects of aging through any renewal term. A positive conclusion could establish the bases for further limiting the license renewal review

*e. Reaffirmation of Conclusions Concerning the Current Licensing Basis and Maintaining the Function of Systems, Structures, and Components*

*(i) Current Licensing Basis*

As defined in § 54.3 of the rule, the CLB is the set of NRC requirements applicable to a specific plant and a licensee's written commitments for ensuring compliance with and operation within applicable NRC requirements and the plant-specific design basis (including all modifications and additions to such commitments over the life of the license) that are docketed and are in effect. A detailed explanation of the CLB, the regulatory processes underlying the CLB, compliance with the CLB, and consideration of the CLB is contained in the SOC for the previous license renewal rule (56 FR 84949; December 13, 1991). In summary, the conclusions made in the SOC for the previous rule remain valid. The CLB represents the evolving set of requirements and commitments for a specific plant that are modified as necessary over the life of a plant to ensure continuation of an adequate level of safety. The regulatory process is the means by which the Commission continually assesses the adequacy of and compliance with the CLB.

Compilation of the CLB is unnecessary to perform a license renewal review.

One commenter argued that the definition of CLB in § 54.3 should be clarified. Specifically, the commenter interprets that licensee written commitments made in docketed licensing correspondence such as responses to bulletins, generic letters, and enforcement actions and commitments in safety evaluations and licensee event reports (items in the third sentence of the definition) should be considered as part of the CLB only to the extent that these commitments reflect compliance with more formal requirements and regulations. These would include those elements of NRC requirements and regulations identified in the first two sentences of the definition. All other licensee commitments identified in those document types listed in the third sentence should not be considered CLB commitments if they are not otherwise necessary to demonstrate compliance with NRC requirements and regulations.

The Commission is aware of public concerns associated with the definition of CLB in § 54.3. Some of these concerns can be explicitly linked to what is meant by the term "written commitments" as it relates to the CLB. These concerns relate to ongoing consideration of the regulatory and licensee processes for defining, identifying, tracking, and validating licensee commitments. Although identified in the license renewal rulemaking process, many of these concerns are not directly associated with license renewal, but are relevant to current commitment management methods and practices. Therefore, the Commission is evaluating concerns associated with the definition of CLB in the context of currently operating reactors and may, in the future, determine that the definition of CLB needs to be clarified. Thus, the Commission concludes that, at this time, a revision to the definition of CLB is premature and will not be considered as part of this rulemaking.

In addition, the Commission concludes that, for the license renewal review, consideration of written commitments only need encompass those commitments that concern the capability of systems, structures, and components, identified in § 54.21(a), integrated plant assessment and § 54.21(c) time-limited aging analyses, to perform their intended functions, as delineated in § 54.4(b).

For the previous rule as well as for this rulemaking, commenters argued that the CLB of a number of plants is inadequate. Multiple examples of

operational concerns and issues at specific plants were identified to demonstrate the inadequacy of the CLBs. One commenter stated that the Yankee Rowe reactor pressure vessel problem (the plant was removed from service rather than show compliance with its CLB for its reactor pressure vessel) demonstrates the inadequacy of CLBs. The commenter stated that "the Rowe experience demonstrated that examination of the licensing basis for extended operation could jeopardize remaining years on the current license."

The Commission did not agree with the comments on the previous rule in this area and comments received for this rulemaking did not provide compelling reasons to alter the previous Commission determinations. The examples cited were all identified by the NRC through the inspection and oversight processes. The identification of these issues through the regulatory process demonstrates that the Commission's programs are effective in identifying and resolving new technical and safety issues and areas of noncompliance in a timely fashion. In each example provided by the commenters, appropriate corrective action was taken or is being taken on a plant-specific or on an industry-wide basis to either modify the CLB to resolve the concern or to ensure the continued compliance with the present CLB. The Commission agrees that the Yankee Rowe case demonstrated that the regulatory process can jeopardize current operation during license renewal activities. The decision to return the Yankee Rowe plant was a utility economic decision when faced with the prospect of demonstrating continued compliance with its CLB. Non-compliance with the CLB, while not shown in the Rowe example, is one of the reasons that justifies the existence of the regulatory process.

Public Citizen stated that the Commission's contention that all reactors are in compliance with their CLBs is both arbitrary and capricious and neither stands the test of logic nor reality. The commenter continued by stating that the "NRC's assumption is based upon the specious argument that having operated without a meltdown for a finite period of time means that safety is adequate."

The Commission does not contend that all reactors are in full compliance with their respective CLBs on a continuous basis. Rather, as discussed in the SOC for the previous rule, the regulatory process provides reasonable assurance that there is compliance with the CLB. The NRC conducts its inspection and enforcement activities

under the presumption that non-compliances will occur.

The Commission does not believe that an absence of accidents over a given period of time equates to adequate safety. Neither does the Commission believe that all risk can be eliminated. Adequate safety is a subjective term that cannot be directly measured. The Commission's performance indicators demonstrate that, while not quantifiable, relative safety levels are increasing. An absence of accidents over a finite period of time can be considered as just one safety performance indicator. Despite improving performance indicators, the Commission intends to continue the meticulous process of insuring and maintaining an adequate level of protection.

Commenters for both the previous rule and for this rulemaking argued that the plant-specific CLB should be compiled and the NRC should verify compliance with the CLB as part of the license renewal process. Public Citizen stated that "The NRC must review the documents which make up the current licensing basis and examine the plant itself in order to determine whether the licensee has complied with the current licensing basis," and further, submission of the documents, and NRC verification of the licensee's compliance with its CLB is necessary to avoid "fraud and abuse." Public Citizen also contends that "[a]bsent the submission of the documents the public and the Commission are left to examine the reactor's license renewal application and the IPA in a vacuum."

The Commission disagrees with the commenter, and points out that the proposed rule did not explicitly require the renewal applicant to compile the CLB for its plant. The Commission rejected a compilation requirement for the previous license renewal rule for the reasons set forth in the accompanying SOC (56 FR at 64952). The Commission continues to believe that a prescriptive requirement to compile the CLB is not necessary. Furthermore, submission of documents for the entire CLB is not necessary for the Commission's review of the renewal application. As stated in section III.b(i) of this SOC, the Commission has determined that the single issue generic to all plants with regard to license renewal is the effects of age-related degradation during the period of extended operation. As explained in the SOC for the previous rule, section IV.c(i) (56 FR at 64948), the CLB of any plant is comprised of numerous regulations, license conditions, the design basis, etc. As discussed in III(e)(ii), "Maintaining the function of systems, structures, and

components," the portion of the CLB that can be impacted by the detrimental effects of aging is the design basis. Thus, there is no compelling reason to consider, for license renewal, any portion of the CLB other than that which is associated with the structures and components of the plant (i.e., that part of the CLB that can suffer detrimental effects of aging). All other aspects of the CLB have continuing relevance in the license renewal period as they do in the original operating term, but without any association with an aging process that may cause invalidation. From a practical standpoint, an applicant must consult the CLB for a structure or component in order to perform an aging management review. The CLB for the structure or component of interest contains the information describing the functional requirements necessary to determine the presence of any aging degradation.

The definition of CLB in § 54.3(a) states that a plant's CLB consists, in part, of "a licensee's written commitments . . . that are docketed . . . ." Because these documents have already been submitted to the NRC and are in the docket files for the plant, they are not only available to the NRC for use in the renewal review, they are also available for public inspection and copying in the Commission's public document rooms. Furthermore, the NRC may review any supporting documentation that it may wish to inspect or audit in connection with its renewal review. If the renewed license is granted, those documents continue to remain subject to NRC inspection and audit throughout the term of the renewed license. The Commission continues to believe that resubmission of the documents constituting the CLB is unnecessary. With respect to the commenter's argument that the CLB needs to be verified, the Commission had concluded when it adopted the previous license renewal rule that a reverification of CLB compliance as part of the renewal review was unnecessary (56 FR at 64951-52). Public Citizen presented no information questioning the continuing soundness of the Commission's rationale, and the Commission reaffirms its earlier conclusion that a special verification of CLB compliance in connection with the review of a license renewal application is unnecessary. The Commission intends, as stated by the commenter, to examine the plant-specific CLB as necessary to make a licensing decision on the continued functionality of systems, structures, and components subject to an aging management review

and a license renewal evaluation. This activity will likely include examination of the plant itself to understand and verify licensee activities associated with aging management reviews and actions being taken to mitigate detrimental effects of aging.

After consideration of all comments concerning the compilation of the CLB, the Commission has reconfirmed its conclusion made for the previous rule that it is not necessary to compile, review, and submit a list of documents that comprise the CLB in order to perform a license renewal review

#### (ii) Maintaining the Function of Systems, Structures, and Components

As discussed in the SOC for the previous license renewal rule, the Commission stated that continued safe operation of a nuclear power plant requires that systems, structures, and components that perform or support safety functions continue to perform in accordance with the applicable requirements in the licensing basis. In addition, the Commission stated that the effects of ARDUTLR must be mitigated to ensure that the aged systems, structures, and components will adequately perform their designed safety or intended function.

In developing this final rule, a key issue that the Commission considered was whether or not a focus on ensuring a system's, structure's or component's function through performance or condition monitoring is a sufficient basis for concluding that the CLB will be maintained throughout the period of extended operation. The Commission considered whether the regulatory process and a focus on functionality during the license renewal review for the period of extended operation are sufficient to provide reasonable assurance that an acceptable level of safety (i.e., the CLB) will be maintained.

Continued safe operation of a commercial nuclear power plant requires that systems, structures, and components that perform or support safety functions continue to function in accordance with the applicable requirements in the licensing basis of the plant and that others do not substantially increase the frequency of challenges to those required for safety. As a plant ages, a variety of aging mechanisms are operative, including erosion, corrosion, wear, thermal and radiation embrittlement, microbiologically induced aging effects, creep, shrinkage, and possibly others yet to be identified or fully understood. However, the detrimental effects of aging mechanisms can be observed by detrimental changes in the performance

characteristics or condition of systems, structures, and components if they are properly monitored.

Aging can affect all systems, structures, and components to some degree. Generally, the changes resulting from detrimental aging effects are gradual. Licensees have ample opportunity to detect these degradations through performance and condition monitoring programs, technical specification surveillances required by § 50.36, and other licensee maintenance activities. Except for some well-understood aging mechanisms such as neutron embrittlement and intergranular stress corrosion cracking, the straightforward approach to detecting and mitigating the effects of aging begins with a process that verifies that the intended design functions of systems, structures, and components have not been compromised or degraded. Licensees are required by current regulations to develop and implement programs that ensure that conditions adverse to quality, including degraded system, structure, or component function, are promptly identified and corrected. The licensees' programs include self-inspection, maintenance, and technical specification surveillance programs that monitor and test the physical condition of plant systems, structures, and components.

For example, technical specifications include limiting conditions for operation (LCOs), which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. Technical specifications also require surveillance requirements relating to test, calibration, or inspection to verify that the necessary quality of systems, structures, and components is maintained, that facility operation is within safety limits, and that LCOs continue to be met. Furthermore, § 50.55a requires, in part, that systems, structures, and components be tested and inspected against quality standards commensurate with the importance of the safety function to be performed, such as inservice testing (IST) and inservice inspections (ISIs) of pumps and valves.

Elements for timely mitigation of the effects of age-related degradation include activities that provide reasonable assurance that systems, structures, and components will perform their intended functions when called on. Through these programs, licensees identify the degradation of components resulting from a number of different environmental stressors as well as degradation from inadequate maintenance or errors caused by

personnel. Once a detrimental performance or condition caused by aging or other factors is revealed, mitigating actions are taken to fully restore the condition to its original design basis. As a result of these programs, degradation due to aging mechanisms (detrimental aging effects) is currently being adequately managed, either directly or indirectly, for most systems, structures, and components.

Consequently, there is considerable logic in ensuring that the design basis (as defined in § 50.2) of systems, structures, and components is maintained through activities that ensure continued functionality. This process, including surveillance, is relied on in the current term to ensure continued operability, (i.e., to the greatest extent practicable, the intended design functions will be properly performed). The focus on maintaining functionality results in the continuing capability of systems, structures, and components, including supporting systems, structures, and components, to perform their intended functions as designed.

A key element of the 10 CFR 54 definition of the CLB is the plant-specific design-basis information defined in 10 CFR 50.2. According to this definition, "[d]esign bases means that information which identifies the specific functions to be performed by a structure, system, or component of a facility, and the specific values or ranges of values chosen for controlling parameters as reference bounds for design." In addition, design bases identify specific functions to be performed by a system, structure, and component, and design-basis values may be derived for achieving functional goals. For plant systems, structures, and components that are not subject to performance or condition-monitoring programs or for those on which the detrimental effects of aging may not be as readily apparent, verification of specific design values (e.g., piping wall thickness) or demonstration by analysis can be a basis for concluding that the required function(s) will be maintained in the period of extended operation.

When the design bases of systems, structures, and components can be confirmed either indirectly by inspection or directly by verification of functionality through test or operation, a reasonable conclusion can be drawn that the CLB is or will be maintained. This conclusion recognizes that the portion of the CLB that can be impacted by the detrimental effects of aging is limited to the design-basis aspects of the CLB. All other aspects of the CLB, e.g., quality assurance, physical

protection (security), and radiation protection requirements, are not subject to physical aging processes that may cause noncompliance with those aspects of the CLB.

Although the definition of CLB in P 54 is broad and encompasses various aspects of the NRC regulatory process (e.g., operation and design requirements), the Commission concludes that a specific focus on functionality is appropriate for performing the license renewal review. Reasonable assurance that the function of important systems, structures, and components will be maintained throughout the renewal period, combined with the rule's stipulation that all aspects of a plant's CLB (e.g., technical specifications) and the NRC regulatory process carry forward into the renewal period, are viewed as sufficient to conclude that the CLB (which represents an acceptable level safety) will be maintained. Functionality is the principal emphasis of much of the CLB and is the focus of the maintenance rule and other regulatory requirements to ensure that aging issues are appropriately managed in the current license term.

An example of performance verification activities that must be performed by licensees is the loss of coolant accident (LOCA)/loss of offsite power (LOOP) integrated tests. This technical specification surveillance is typically required to be performed at least once every 18 months. This test simulates a coincident LOCA/LOOP (design-basis accident) for each train division of emergency alternating current (ac) power source (e.g., emergency diesel generators), the associated emergency core cooling systems (e.g., safety injection subsystems), and other electrically driven safety components (e.g., containment isolation valves, emergency ventilation/filtration components, and auxiliary feedwater components). All engineered safety features required to actuate for an act LOCA/LOOP are required to actuate the test and either duplicate the LOC LOOP function completely (e.g., electric loads are sequenced onto emergency busses, containment isolation valves actually shut from fully open position or approximate the actual function to the greatest extent practicable (e.g., safety injection pumps start and run recirculation mode instead of actually injecting water into the reactor coolant system). Design-basis values that can only be measured during this testing such as load sequence times and emergency bus voltage response to the sequenced loads, are directly verified

Between integrated tests, monthly and quarterly surveillances verify specific component performance criteria such as emergency diesel generator start times or pump flow values. The acceptance criteria stated in the surveillance requirements are derived from design-basis values with appropriate conservatism built in to account for any uncertainties or measurement tolerances. Satisfactory accomplishment and periodic repetition of these types of surveillance provide reasonable assurance that system, structure, and component functions will be performed as designed.

#### *f. Integrated Plant Assessment*

The previous license renewal rule required license renewal applicants to perform a systematic screening of plant systems, structures, and components to ultimately determine if aging would be adequately managed in the period of extended operation. This IPA process would begin broadly and consider all plant systems, structures, and components. The IPA would then focus on only those that are important to license renewal and finally on only those structures and components that could be subject to ARDUTLR. For those structures and components subject to ARDUTLR, the IPA process required an evaluation and demonstration that either (1) new programs or licensee actions would be implemented to prevent or mitigate any ARDUTLR during the period of extended operation or (2) justifies that no actions are necessary.

On the basis of experience gained from implementation of the previous license renewal rule, the Commission determined that the previous rule required the evaluation of an unnecessarily large number of plant systems, structures, and components to establish appropriate aging management in the period of extended operation. This experience, further consideration of existing activities, and the recent adoption of the maintenance rule have led the Commission to conclude that many of these systems, structures, and components are already subject to activities that ensure their function through any period of extended operation. Therefore, the Commission is amending the IPA process in this rulemaking to more efficiently focus the license renewal review on certain structures and components for which the regulatory process and existing licensee programs and activities may not adequately manage the detrimental effects of aging in the period of extended operation.

The approach reflected in this rule maintains the requirement for each renewal applicant to address possible detrimental effects of aging for certain systems, structures and components during the period of extended operation through the IPA process. The rule will simplify the IPA process consistent with (1) the Commission's determination that the aging management review should focus on ensuring that structures and components perform their intended function(s) and (2) the additional experience the Commission has gained related to aging management review since publishing the current license renewal rule.

The IPA process continues to require an initial review of all plant systems, structures, and components to identify the scope of structures and components requiring aging management review for license renewal. The principal differences between the IPA process in the previous license renewal rule and the IPA process in this rule is—

- (1) The determination of the reduced set of structures and components that must undergo an aging management review;
- (2) The form of the aging management review (managing the effects of aging on functionality versus managing aging mechanisms); and
- (3) The elimination of the term, "ARDUTLR"

#### *(i) Determination of Structures and Components Requiring Aging Management Review for License Renewal*

In the SOC for the previous license renewal rule, the Commission stated that, as it gains more experience with age-related degradation reviews, it may revisit the need for such a disciplined review process and may narrow the scope of the safety review. The Commission now believes that after reviewing its recent implementation experience, a narrower scope of review is warranted. The Commission concludes that a generic exclusion from aging management review is appropriate for those categories of structures and components subject to existing programs and activities that the Commission believes are sufficient to provide reasonable assurance of continued function in the period of extended operation.

As discussed in Section III.d of this SOC, the Commission has determined that the existing regulatory process, existing licensee programs and activities, and the maintenance rule provide the basis for generically excluding structures and components that perform active functions from an

aging management review. However, the Commission does not believe that it can generically exclude structures and components that—

- (1) Do not have performance and condition characteristics that are as readily monitorable as active components; and
- (2) Are not subject to periodic, planned replacement.

Unlike the extensive experience associated with the performance and condition monitoring of the active functions of structures and components, little experience has been gained from the evaluation of long-term effects of aging on the passive functions of structures and components. The Commission considers that the detrimental effects of aging affecting passive functions of structures and components are less apparent than the detrimental effects of aging affecting the active functions of structures and components. Therefore, the Commission concludes that a generic exclusion for passive structures and components is inappropriate at this time. The Commission also concludes that an aging management review of the passive functions of structures and components is warranted to provide the reasonable assurance that their intended functions are adequately maintained during the period of extended operation. Additional experience with managing the effects of aging on the function of these structures and components may narrow the selection of structures and components requiring an aging management review for license renewal in the future.

New Jersey commented that since so much of original plant design assumed 40 years of service, utilities should be required to determine the actual conditions of systems, structures, and components at the 40-year point "license renewal milestone."

The focus of the license renewal rule on passive, long-lived structures and components conforms to the commenter's concern. For a licensee to perform an effective aging management review of long-lived, passive structures and components identified in the IPA, a logical starting point for a given structure or component may be to assess its current condition against the CLB via a "one time" inspection. Although this assessment is not specifically required by the rule, the licensee must demonstrate that the effects of aging will be managed so that the intended function(s) will be maintained for the period of extended operation. If a licensee chooses not to perform a "one time" inspection or similar assessment for a particular structure or component,

the aging management review must still adequately demonstrate that detrimental effects of aging will be managed during the period of extended operation.

(a) "Passive" Structures and Components

In Section III.d of this SOC, the Commission concluded that structures and components that perform active functions can be generically excluded from an aging management review on the basis of performance or condition-monitoring programs. The Commission recognizes that structures and components that have passive functions generally do not have performance and condition characteristics that are as readily monitorable as those that perform active functions. Therefore, the Commission concludes that an aging management review is required for structures and components within the scope of the license renewal rule that perform passive intended functions.

The Commission has reviewed several industry concepts of "passive" structures and components and has determined that they do not accurately describe the structures and components that should be subject to an aging management review for license renewal. Accordingly, the Commission has developed a description of "passive" characteristics of structures and components. Furthermore, the Commission has directly incorporated these characteristics into the IPA process to avoid the creation of a new term, "passive." This SOC uses the term "passive" for convenience. Furthermore, the description of "passive" structures and components incorporated into § 54.21(a) should be used only in connection with the IPA review in the license renewal process.

The Commission has determined that passive structures and components for which aging degradation is not readily monitored are those that perform an intended function without moving parts or without a change in configuration or properties. For example, a pump or valve has moving parts, an electrical relay can change its configuration, and a battery changes its electrolyte properties when discharging. Therefore, the performance or condition of these components is readily monitored and would not be captured by this description. Further, the Commission has concluded that "a change in configuration or properties" should be interpreted to include "a change in state," which is a term sometimes found in the literature relating to "passive." For example, a transistor can "change its state" and therefore would not be screened in under this description.

Structures or components may have active functions, passive functions, or both. For example, although a pump or a valve has some moving parts, a pump casing or valve body performs a pressure-retaining function without moving parts. A pump casing or a valve body meets the Commission's description and would therefore be considered for an aging management review. However, the moving parts of the pump, such as the pump impeller, would not be subject to aging management review. Additionally, the maintenance rule implementation guidance (Regulatory Guide 1.160) contains a provision by which licensees may classify certain systems, structures, and components (e.g., raceways, tanks, and structures) as "inherently reliable." Inherently reliable systems, structures, and components by definition generally do not require any continuing maintenance actions and should be considered as "passive."

As examples of the implementation of this screening requirement, the Commission considers structures and components meeting the passive description as including, but 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.

Additionally, the Commission determined that structures and components that perform active functions are not subject to an aging management review (e.g., 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). However, pressure-retaining boundaries (e.g., pump casings, valve bodies, fluid system piping) and structural supports (e.g., diesel generator structural supports) that are necessary for the structure or component to perform its intended function meet the description of passive, and will be subject to an aging management review.

A commenter requested clarification as to whether the Commission intended pressure boundaries, other than the

reactor coolant pressure boundary, to be included in an aging management review (e.g., pressurized water reactor main steam lines). The Commission does not limit the consideration of pressure boundaries for an aging management review to only the reactor coolant pressure boundary. All pressure retaining boundaries necessary for the performance of the intended functions delineated in § 54.4 would be subject to an aging management review. For example, those portions of a plant's main steam lines that meet the intended function criteria of § 54.4 would be included in an aging management review.

One commenter expressed a belief that cables were prematurely included as "passive" and should not be subject to an aging management review. The commenter stated that the only aging effects of cables are shorting and loss of continuity, and for cables not in a harsh environment, these effects would be immediately detected during normal operation or functional testing. The Commission considers the examples of electrical components (e.g., electrical cables, connections, and electrical penetrations) listed in 10 CFR 54.21(a)(1)(i) and Section III.f(i)(a) of the SOC to be properly categorized as "passive" because they perform their intended function without moving parts or without a change in configuration or properties and the effects of aging degradation for these components are not readily monitorable. The Commission also believes that this categorization is not premature as stated by the commenter.

The Commission disagrees with the commenter's assertion that the aging effects of cable make it easy to monitor functional degradation. Although there have been significant advances in this area, there is no single method or combination of methods that can provide the necessary information about the condition of electrical cable currently in service regarding the extent of aging degradation or remaining qualified life. Degradation due to aging of electrical cables caused by elevated temperature and radiation can cause embrittlement in the form of cracking of insulation and jacket materials. The cracks degrade the electrical properties of the insulation materials. The major concern is that failures of deteriorated cable systems (cables, connections, and penetrations) might be induced during accident conditions. Because these components are relied on to remain functional during and following design basis events (including conditions of normal operation) and there are currently no known effective methods

for continuous monitoring of cable systems, these examples of passive electrical components subject to an aging management review will remain in 10 CFR 54.21(a)(1)(i) and Section III.f(ii)(a) of the SOC.

(b) "Long-Lived" Structures and Components

The Commission recognizes that, as a general matter, the effects of aging on a structure or component are cumulative throughout its service life. One way to effectively mitigate these effects is to replace that structure or component, either (i) on a specified interval based upon the qualified life of the structure or component or (ii) periodically in accordance with a specified time period to prevent performance degradations leading to loss of intended function during the period of operation.

Where a structure or component is replaced based upon a qualified life (appropriately determined), it follows that the replaced structure or component will not experience detrimental effects of aging sufficient to preclude its intended function. This is because the purpose of qualification of the life of a structure or component is to determine the time period for which the intended function of that structure or component can be reasonably assured.

Where a structure or component is replaced periodically in accordance with a specified time period, the regulatory process will ensure that degraded performance of the structure or component experienced during the replacement interval will be adequately addressed and the established replacing interval will be appropriate. Thus, there is a high likelihood that the detrimental effects of aging will not accumulate during the subsequent period such that there is a loss of intended function.

In sum, a structure or component that is not replaced either (i) on a specified interval based upon the qualified life of the structure or component or (ii) periodically in accordance with a specified time period, is deemed by § 54.21(a)(1)(ii) of this rule to be "long-lived" and therefore subject to the § 54.21(a)(3) aging management review.

It is important to note, however, that the Commission has decided not to generically exclude passive structures and components that are replaced based on performance or condition from an aging management review. Absent the specific nature of the performance or condition replacement criteria and the fact that the Commission has determined that components with "passive" functions are not as readily monitorable as components with active

functions, such generic exclusion is not appropriate. However, the Commission does not intend to preclude a license renewal applicant from providing site-specific justification in a license renewal application that a replacement program on the basis of performance or condition for a passive structure or component provides reasonable assurance that the intended function of the passive structure or component will be maintained in the period of extended operation.

A commenter recommended that the Commission exclude specific components from an aging management review if they have been replaced in the later years of the original license or if they are subject to routine testing. The Commission believes that one-time component replacements and replacements based on routine testing are essentially replacements based on performance or condition. Absent the specific nature of the performance or condition replacement criteria (e.g., routine testing program) it is not appropriate for the Commission to generically exclude all such replacement programs of passive structures and components. However, the Commission does not preclude a license renewal applicant from providing a plant-specific justification in a license renewal application that a one-time replacement program or replacement program on the basis of routine testing of passive structures and components provides reasonable assurance that functionality will be maintained in the period of extended operation.

A commenter requested that the Commission provide an example of a performance- or condition-based replacement program that could be used to justify that aging effects will be adequately managed during the period of extended operation. While an exact application of a performance or condition replacement is necessarily dependent on plant-specific situations and their respective aging effects of concern, the Commission would generally expect that such a replacement program would have defined performance or condition measuring methods (e.g., wall thickness of heat exchanger tubes), an established monitoring frequency that supports timely discovery of degraded conditions (e.g., every refueling outage), and an appropriate replacement criterion (e.g., upon reaching a specified number of tubes plugged).

One commenter stated that the Commission should consider dividing long-lived passive structures and components into two categories: those

that have a less rigorous approach to oversight and maintenance and those that have a sufficiently high level of licensee programs and regulatory oversight. The commenter then suggests that the rule should recognize the quality and effectiveness of the programs in the second category and appropriately credit them relative to an aging management review. Specifically, the commenter provided the reactor coolant pressure boundary as an example of a passive, long-lived component for which rigorous programs and regulatory oversight currently exist to adequately manage the effects of aging. Currently, the Commission believes it would be too difficult to further divide the structures and components required for an aging management review into those passive, long-lived structures and components "rigorously" managed and those "not as rigorously" managed. The variations among plant specific designs and programs make such a determination unmanageable at present. However, as the Commission gains more experience with industry activities for management of passive, long-lived structures and components, it may consider further narrowing the scope of those structures and components requiring an aging management review. With regard to the commenter's specific example of the reactor coolant pressure boundary, because of its high-risk significance, the differences in plant-specific design and operational histories, and the lack of operating experience beyond the original operating terms, the Commission does not believe it appropriate to generically exclude the reactor coolant pressure boundary from an aging management review.

(ii) The IPA Process

The Commission revised and simplified the IPA requirements (§ 54.21(a)) as follows:

First, instead of listing those systems, structures, and components that are important to license renewal, only a list is required (from those systems, structures, and components within the scope of license renewal) of structures and components that a licensee determines to be subject to an aging management review for the period of extended operation. A licensee has the flexibility to determine the set of structures and components for which an aging management review is performed, provided that this set encompasses the structures and components for which the Commission has determined an aging management review is required for the period of extended operation.

Therefore, a licensee's aging management review must include structures and components—

(1) That were not subject to replacement based on a qualified life or a specified time period; and

(2) That perform an intended function (§ 54.4) without moving parts or without a change in configuration or properties.

In establishing this flexibility, the Commission recognizes that licensees may find it preferable to not take maximum advantage of the Commission's generic conclusion regarding structures and components that do not require an aging management review, and may undertake a broader scope of review than is minimally required. For example, a licensee may desire to review all "passive" structures and components. This set of structures and components would be acceptable because it includes "long-lived" as well as periodically replaced structures and components and, therefore, encompasses all structures and components that would be identified through criteria (1) and (2) above.

Second, the IPA must contain a description of the methodology used to determine those systems, structures, and components within the scope of license renewal and those structures and components subject to an aging management review.

Third, the IPA must contain a demonstration, for each structure and component subject to an aging management review, that the effects of aging will be managed so that the intended function(s) will be maintained for the period of extended operation. This demonstration must include a description of activities, as well as any changes to the CLB and plant modifications that are relied on to demonstrate that the intended function(s) will be adequately maintained despite the effects of aging in the period of extended operation.

A commenter suggested that the regulatory text include a more comprehensive list of components subject to an aging management review in order to clarify its intent. The Commission decided that not to include a more detailed list of components subject to an aging management review. Components subject to an aging management review are highly plant specific and the Commission does not intend to establish plant-specific lists by regulation. However, the Commission will include additional clarification and examples of components requiring an aging management review in its implementation guidance for the rule.

DOE commented that the wording in § 54.21(a)(3), requiring a demonstration that the effects of aging will be managed so that the intended function(s) will be maintained, could be interpreted too restrictively. Specifically, DOE asserts that the IPA process serves to demonstrate that a structure or component will perform in a manner consistent with the CLB rather than to provide "absolute" assurance that the structure or component will not fail. Therefore, DOE recommends revising § 54.21(a)(3) to include requiring a demonstration that the effects of aging are "adequately managed" and that the intended functions are maintained, "to the extent required by the CLB."

The Commission agrees with DOE that the IPA process is not intended to demonstrate absolute assurance that structures or components will not fail, but rather that there is reasonable assurance that they will perform such that the intended functions, as delineated in § 54.4, are maintained consistent with the CLB. The Commission has clarified the wording in § 54.21(a)(3) to require a demonstration that the effects of aging be adequately managed so that the intended function(s) will be maintained consistent with the CLB.

One commenter suggested that the amendment provides more uncertainty as to which structures and components should be considered for an aging management review. Specifically, the commenter cited fasteners as an example of what is important but appears not to be considered in the proposed rule. The commenter states that the NRC should provide more detailed guidance.

The Commission does not agree that the rule provides more uncertainty with regard to what structures and components should be considered. In fact, the rule provides clear criteria for what types of structures and components must be subject to an aging management review—namely passive, long-lived structures and components from those determined to be within the scope of license renewal. With regard to the specific example of fasteners cited by the commenter, the rule would require an aging management review for fasteners because fasteners are considered to be passive and if the fasteners (1) were determined to be within the scope of license renewal as defined in § 54.4 and (2) were determined not to be subject to periodic replacement or replacement based on a qualified fastener life. As in the previous rule, this rule does not delineate a comprehensive list of the specific structures and components that

must be considered for an aging management review.

#### *g. Time-Limited Aging Analyses and Exemptions*

##### *(i) Time-Limited Aging Analyses*

The definition of ARDUTLR in the previous license renewal rule requires a licensee evaluation and NRC approval of previous time-limited aging analyses for systems, structures, and components within the scope of license renewal that either were based on an assumed service life or a period of operation defined by the original license term. For example, certain plant-specific safety analyses may have been based on an explicitly assumed 40-year plant life (e.g., aspects of the reactor vessel design). As a result, an evaluation for license renewal would be required. Those time-limited aging analyses that need to be evaluated for renewal are limited to those analyses with (i) time-related assumptions, (ii) utilized in determining the acceptability of systems, structures, and components within the scope of license renewal (as defined in Section 54.4), (iii) which are based upon a period of plant operation equal to or greater than the current license term, but less than the cumulative period of plant operation (viz., the existing license term plus the period of extended operation requested in the renewal application). Time-limited aging analyses based on an assumed period of plant operation short of the current operating term should be addressed within the original license and need not be reviewed for license renewal.

Because the Commission deleted the term of ARDUTLR, this license renewal rule identifies these explicit time-limited analyses as issues that must be clearly addressed within the license renewal process. This rule explicitly requires that—

(1) Applicants perform an evaluation of time-limited aging issues relevant to systems, structures, and components within the scope of license renewal in the license renewal application; and

(2) The adequate resolution of time-limited aging analysis issues as part of the standards for issuance of a renewed license.

The time-limited provisions or analyses of concern are those that—

(1) Involve the effects of aging;

(2) Involve time-limited assumptions defined by the current operating term, for example, 40 years;

(3) Involve systems, structures, and components within the scope of license renewal;

(4) Involve conclusions or provide the basis for conclusions related to the

capability of the system, structure, and component to perform its intended functions:

(5) Were determined to be relevant by the licensee in making a safety determination; and

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

The applicant for license renewal will be required in the renewal application to—

(1) Justify that these analyses are valid for the period of extended operation;

(2) Extend the period of evaluation of the analyses such that they are valid for the period of extended operation, for example, 60 years; or

(3) Justify that the effects of aging will be adequately managed for the period of extended operation if an applicant cannot or chooses not to justify or extend an existing time-limited aging analysis.

The Commission considers analyses to be "relevant" if the analyses provided the basis for the licensee's safety determination and, in the absence of the analyses, the licensee may have reached a different safety conclusion. Time-limited aging analyses that need to be addressed in a license renewal evaluation are not necessarily those analyses that have been previously reviewed or approved by the Commission. The following examples illustrate time-limited aging analyses that need to be addressed and were not previously reviewed and approved by the Commission.

(1) The FSAR states that the design complies with a certain ASME Code requirement. A review of the ASME Code requirement reveals that a time-limited aging analysis is required. The actual calculation was performed by the licensee to meet code requirements. The specific calculation was not referenced in the FSAR and the NRC had not reviewed the calculation.

(2) In response to a generic letter, a licensee submitted a letter to the NRC committing to perform a time-limited aging analysis 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 Commission expects that the number of time-limited aging analyses that need to be addressed in a license renewal evaluation is relatively small. Although the number and type will vary depending on the plant-specific CLB, these analyses could include reactor vessel neutron embrittlement (pressurized thermal shock, upper-shelf energy, surveillance program), concrete containment tendon prestress, metal fatigue, environmental qualification

(EQ) of electrical equipment, metal corrosion allowance, inservice flow growth analyses that demonstrate structural stability for 40 years, inservice local metal containment corrosion analyses, and high-energy line-break postulation based on fatigue cumulative usage factor.

Three issues were raised by five commenters relating to time-limited aging analyses in the proposed rule.

(1) The proposed rule contains a definition of time-limited aging analyses in § 54.3 which is further discussed in the proposed SOC. However, the proposed rule definition appeared to contain two criteria in defining time-limited aging analyses while the discussion in the proposed SOC appeared to contain six criteria. Three commenters indicated that there may be potential inconsistencies between the proposed rule definition and the proposed SOC. The commenters recommended various methods for incorporating the SOC language in the rule.

The proposed SOC discussion was intended to further clarify the criteria contained in the proposed rule definition. After reviewing the comments, the Commission has decided to replace the proposed definition of time-limited aging analyses in § 54.3 with the six criteria in the proposed SOC as recommended.

(2) One commenter recommended reconsideration of all proposed plant modifications which were not imposed by the Commission due to a cost-benefit analysis that had time-dependent factors. The commenter suggested that this should include any backfits which the Commission declined to impose, as well as potential plant modifications to reduce risk identified in programs such as the individual plant examination (IPE) and the individual plant examination of external events (IPEEE) for severe accident vulnerabilities.

The Commission does not regard such reconsideration to be necessary to provide reasonable assurance that there is no undue risk to the public health and safety for the period of extended operation of nuclear power plants.

As discussed in the SOC for the previous license renewal rule (56 FR 64943 at 64948), in NUREG-0933, A Prioritization of Generic Safety Issues, the NRC examined 249 generic safety issues (GSIs) that had been resolved through October 1990, in order to identify possible cases where consideration of the additional period of operation during the renewal term might have altered the NRC's regulatory decision not to undertake additional action. Of the 139 GSIs resolved through

October 1990 that did not result in backfits, the Commission found that only 3 issues for which a reexamination of the backfit determination appeared to be prudent. In two instances, the reexamination confirmed the appropriateness of the no backfit conclusion for an additional 20 years of operation beyond the original 40-year license term. The third issue (GSI item IIIA.1.3 "Maintain Supply of Thyroid Blocking Agent") had been placed in the resolution process for reasons apart from license renewal. Thus, cost-benefit analyses of the resolved GSIs were relatively insensitive to consideration of the period of extended operation. The cost-benefit methodologies utilized in resolution of GSIs are the same as those used by the NRC in conjunction with the full gamut of regulatory actions involving nuclear power plants, including rulemaking and enforcement. Since the methodologies are the same, the Commission believes that the results of NUREG-0933 can be reasonably extrapolated to other regulatory assessments where backfits were not imposed on the basis of cost-benefit analyses limited to 40 years of operation. Furthermore, cost-benefit considerations simply do not come into play in backfit determinations involving adequate protection—except in selecting among different ways of achieving adequate protection, as is acknowledged in 10 CFR 50.109(a)(7). The IPE and IPEEE are licensees' studies to search for plant vulnerabilities to internal and external events. As such, the IPE and IPEEE are not intended to identify or address matters involving adequate protection and, to date, no such issues have been identified.

(3) Two commenters recommended clarifying that the requirement of time-limited aging analyses does not apply to a component that is replaced based on a qualified life less than the full original license term. The commenters cited the EQ of electrical equipment pursuant to § 50.49 as a specific example. This type of equipment is replaced during the current license term and will continue to be replaced during the renewal term based on its qualified life.

The Commission's intent for the requirement of time-limited aging analyses is to capture, for renewal review, certain plant-specific aging analyses that are explicitly based on the duration of the current operating license of the plant. The Commission's concern is that these aging analyses do not cover the period of extended operation. Unless these analyses are evaluated, the Commission does not have assurance that the systems, structures, and components addressed by these

analyses can perform their intended function(s) during the period of extended operation. The periodic replacement program discussed in the previous paragraph would ensure that the subject component can perform its intended function(s) during the period of extended operation. Thus, the Commission agrees with the commenters that components replaced based on qualified lives less than the duration of the current license term need not be addressed under time-limited aging analyses for renewal if the scheduled replacement continues to be performed in the period of extended operation. This is consistent with the definition of time-limited aging analyses in § 54.3.

#### (ii) Exemptions

The previous license renewal rule required that an applicant for license renewal provide a list of all plant-specific exemptions granted under 10 CFR 50.12. An evaluation that justifies the continuation of the exemptions for the renewal term must be provided for exemptions that were either granted on the basis of an assumed service life or a period of operation bounded by the original license term of the facility or otherwise related to systems, structures, or components subject to ARDUTLR.

With the deletion of the definition of ARDUTLR and the corresponding addition of a separate time-limited aging analysis requirement, the Commission has included this exemption review with the separate time-limited aging analysis requirement in § 54.21(c). This change is consistent with the Commission's intent to review exemptions based on time-limited aging analyses under the current rule.

Two commenters questioned the proposed requirement to list and evaluate all granted exemptions, including those that are no longer in effect. One commenter recommended that only exemptions in effect at the time of renewal application and continuing into the period of extended operation should be considered for renewal. Further, the other commenter indicated that requiring a listing of all exemptions is inconsistent with the removal of other lists currently required in 10 CFR 54, such as the list of systems, structures, and components important to license renewal, to provide applicants flexibility in developing suitable methodologies to implement the requirements of § 54.21. The Commission agrees with the commenters. Exemptions that have expired are no longer part of the CLB for that plant. Further, a requirement to list all exemptions in effect is unnecessary

because the only exemptions of concern for license renewal are those that have time-limited aging analyses.

Thus, the Commission has revised § 54.21(c)(2) to require a listing of only those exemptions in effect at the time of renewal application that are based on time-limited aging analyses as defined in § 54.3.

The Commission will rely on explicit wordings in the granted exemptions to determine if an exemption is in effect at the time of renewal application. The Commission will not require an exemption to be considered for license renewal if the exemption was granted with an explicit expiration date that has passed prior to the renewal application. However, the Commission will require exemptions granted without explicit expiration dates to be considered for renewal. If an applicant believes that a certain exemption has expired and yet the supporting documentation does not have a clearly stated expiration date, the applicant should update its CLB prior to submitting its renewal application to clearly indicate that the exemption has expired.

#### *h. Standards for Issuance of a Renewed License and the Scope of Hearings*

Section 54.29 of the previous license renewal rule provided that the Commission may issue a renewed license if—

(a) Actions have been identified and have been or will be taken with respect to age-related degradation unique to license renewal of systems, structures, and components important to license renewal, such that there is reasonable assurance that the activities authorized by the renewed license will be conducted in accordance with the current licensing basis, and that any changes made to the plant's current licensing basis in order to comply with this paragraph are otherwise in accord with the Act and the Commission's regulations.

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

(c) Any matters raised under 10 CFR 2.758 have been addressed as required by that section.

Issues that were material to the findings in § 54.29 of the previous rule, as well as matters approved by the Commission for hearing under § 2.758, were within the scope of a hearing on a renewed license. The previous license renewal rule modified § 2.758 to clarify that challenges to the license renewal rule in an adjudicatory hearing on a renewal application would be considered by the Commission only in the following limited circumstances:

(1) That there are special circumstances with respect to age-related degradation unique to license renewal or environmental protection so that application of either 10 CFR Part 54 or 10 CFR Part 51 would not serve the purpose for which these rules were intended, or

(2) Because of circumstances unique to the period of extended operation, there would be noncompliance with the plant's CLB or operation that is inimical to the public health and safety during the period of extended operation.

The intent of those provisions in the previous rule was to clarify that safety and environmental matters not unique to the period of extended operation would not be the subject of the renewal application or the subject of a hearing in a renewal proceeding absent specific Commission direction. Rather, issues that represent a current problem for operation would have been addressed in accordance with the Commission's regulatory process and procedures. Thus, under the previous rule, a member of the public who believed that a current problem exists with a license or a matter exists that is not adequately addressed by current NRC regulations would have either petitioned the NRC to take appropriate action under § 2.206, or petitioned the NRC to institute rulemaking to address the issue under § 2.802.

The Commission continues to believe that aging management of certain important systems, structures, and components during this period of extended operation should be the focus of a renewal proceeding and that issues concerning operation during the currently authorized term of operation should be addressed as part of the current license rather than deferred until a renewal review (which would not occur if the licensee chooses not to renew its operating license). However, in this final rule, the Commission has narrowed the scope of structures and components that will require an aging management review for the period of extended operation and identification and evaluation of time-limited aging analyses by the applicant. Accordingly, conforming changes in § 54.29 have been made to reflect the refocused renewal review. Specifically, § 54.29 has been revised to delete the term "age-related degradation unique to license renewal," and substitute the findings (required for consistency with the revised § 54.21 (a)(3) and (c)) with respect to aging management review and time-limited aging analyses evaluation for the period of extended operation. Furthermore, § 2.758 has similarly been revised to delete the terms "age-related

degradation unique to license renewal" and "unique to the requested term." The elimination of ARDUTLR requires elimination of the concept that the renewal review or hearing must be confined to aging issues that are "unique" to license renewal. Instead, limits on the scope of renewal review and hearing are based on careful review of the sufficiency of the NRC regulatory process to resolve issues not considered in renewal.

Section 54.29 of the proposed rule (59 FR 46579) was intended to accomplish several things. Proposed § 54.29(a) was intended to define the findings that the Commission must make in order to issue a renewed operating license to a nuclear power plant and the scope of any hearing on the renewal application.<sup>2</sup> By contrast, proposed § 54.29 (b) and (c) were intended to identify the issues that were NOT to be part of the renewal review and to re-emphasize the renewal applicant's obligation under its current operating license to address, in the context of that license, those aging matters identified in the course of its renewal review that may reasonably be expected to cause a loss of function for systems, structures, or components during the current term of operation. Both DOE and NEI commented that by combining these purposes into a single section, the proposed rule could be erroneously interpreted as requiring a general demonstration of compliance with the CLB as a prerequisite for issuing a renewed license. While the Commission believes that the proposed rule was sufficiently clear in distinguishing between the issues that must be addressed as part of the renewal review versus those which must be addressed in the context of the current license, the Commission has considered the comments of DOE and NEI as evidence that the language of the proposed rule could be further improved. Upon review of NEI's and DOE's proposals, the Commission has decided to adopt an approach similar to the DOE proposal, which narrows § 54.29 to the findings to be made for issuance of a renewed license, and describes in a new section, 54.30, the licensee's responsibilities for addressing safety matters under its current license, that are not within the scope of the renewal review. Separating the subjects into two different sections should minimize any possibility of

misinterpreting the scope of the renewal review and finding.

Section 54.29(a) of the proposed rule set forth the three findings, in paragraphs (a)(1), (a)(2) and (a)(3), which the NRC must make in order to issue a renewed license. The first finding in paragraph (a)(1) was divided into two numbered paragraphs (1)(i) and (1)(ii). DOE commented that numbering the clauses could lead to an erroneous interpretation that two separate, parallel conditions must be met in order to make the first finding. To avoid the potential misinterpretation, DOE recommended a revised numbering scheme. The Commission agrees that separately numbering clauses (i) and (ii) in paragraph (a)(1) could lead to an erroneous interpretation that two parallel conditions must be met in order to make the finding in paragraph (a)(1). Therefore, the Commission has adopted an approach similar to the DOE proposal.

#### *i. Regulatory and Administrative Controls*

Certain regulatory and administrative controls in the previous license renewal rule were imposed to specify the circumstances and requirements necessary to make changes relating to the determination and management of ARDUTLR and the recordkeeping and reporting requirements relating to the renewal application. In view of the greater reliance on existing programs in the license renewal process, as discussed in Section III.d of this SOC, the Commission has determined that many of these requirements are no longer necessary. Therefore, the Commission has decreased the recordkeeping and reporting burden on the applicant for license renewal in the level of detail in the application, requirements for supplementing the FSAR, and in recordkeeping requirements.

The Commission seeks to ensure that, in general, only the information needed to make its safety determination is submitted to the NRC for license renewal review and that regulatory controls imposed by the license renewal rule are consistent with existing regulatory controls on similar information that may be developed by a licensee during the current operating term.

#### *(i) Controls on Technical Information in an Application*

In § 54.21, the previous license renewal rule requires that an application include a supplement to the FSAR that presents the information required by this section. This

information included the IPA lists of systems, structures, and components, justification for assessment methods, and descriptions of programs to manage ARDUTLR.

The simplification of the IPA process (Section III.f of this SOC) and the clarification of the concept of ARDUTLR (Section III.b of this SOC) have resulted in a potential inconsistency regarding the treatment of information associated with the IPA. The Commission has determined that there is no need to include the entire IPA in an FSAR supplement because only the information associated with the IPA regarding the basis for determining the aging effects are managed during the period of extended operation requires the additional regulatory oversight afforded by placing the information in the FSAR. Therefore, only a summary description of the programs and activities for managing the effects of aging during the period of extended operation for those structures and components requiring an aging management review needs to be included in the FSAR supplement. The IPA methodology and the list of structures and components need not appear in an FSAR supplement, although this information will still be required in the application for license renewal.

The Commission has also eliminated § 54.21 (b) and (d) of the previous rule. These sections concern CLB changes associated with ARDUTLR and plant modifications necessary to ensure that ARDUTLR is adequately managed during the period of extended operation. This information is now required as part of § 54.21 (a)(3) and (c). Relevant information concerning changes to the CLB and plant modifications required to demonstrate that aging effects for systems, structures, and components requiring an aging management review for license renewal must be described in the application for license renewal (§ 54.21 (a)(3) and (c)). If a license renewal applicant or the Commission determines that CLB changes or plant modifications form the basis for an IPA conclusion regarding structures and components requiring an aging management review, then an appropriate description of the CLB change or plant modification must be included in the FSAR supplement. Subsequent changes are controlled by § 50.59.

Section 54.21(c) of the previous license renewal rule required that an applicant for license renewal submit (1) a list of all plant-specific exemptions granted pursuant to 10 CFR 50.12 and each relief granted pursuant to 10 CFR

<sup>2</sup> The scope of Commission review determines the scope of admissible objections in a renewal hearing subject to a Commission finding under 10 CFR 2.754.

50.55a and (2) an evaluation if the exemption or relief was related to a system, structure, or component that was subject to ARDUTLR or a time-limited function. These lists and evaluations were to be included in the supplement to the FSAR. At that time, the Commission determined that these requirements were necessary to make an independent assessment that all exemptions and reliefs had been evaluated as part of the license renewal process. The Commission determined that these requirements were important because they provided a summary of the instances in the licensing basis for the period of extended operation in which the staff determined that strict compliance with existing regulatory requirements is not needed to ensure that the public health and safety is adequately protected.

The Commission continues to believe that the rationale and basis for requiring the information to be submitted are still valid for exemptions. The Commission has relocated the requirement to list and evaluate certain exemptions to proposed § 54.21(c). Thus, these exemptions can, therefore, be considered a subset of time-limited aging issues.

Consistent with the Commission's rationale for including only a summary description of programs and activities in the FSAR supplement, the Commission concludes that only a summary description of the evaluation of time-limited aging analyses, including a summary of the bases for exemptions that are based on time-limited aging analyses, needs to be included in the FSAR supplement. The Commission concludes that no needs exist to establish additional requirements that place the list of exemptions or specific exemption evaluations into the FSAR supplement, although this information must still be contained in the application for license renewal.

A relief from Codes need not be evaluated as part of the license renewal process. A relief granted pursuant to 10 CFR 50.55a is specifically envisioned by the regulatory process. A relief expires after a specified time interval (not to exceed 10 years) and a licensee is required to rejustify the basis for the relief. At that time, the NRC performs another review and may or may not grant the relief. Because a relief is, in fact, an NRC-approved deviation from the Codes and subject to a periodic review, the Commission concludes that reliefs are adequately managed by the existing regulatory process and should not require an aging management review and potential rejustification for license renewal. Therefore, the Commission has

deleted the requirement to list and evaluate reliefs from § 54.21(c).

In its comments, NEI noted that the requirement contained in § 54.22 of the proposed rule requiring justification for technical specifications changes that are necessary to manage the effects of aging in the period of extended operation be placed in the FSAR supplement is not generally consistent with current regulatory practices. NEI states that the basis for such technical specification changes only should be required to be documented in the bases section of the technical specifications. The Commission agrees with NEI concerning the requirement to include the justification for technical specifications in the FSAR supplement and has clarified the requirement in § 54.22 to be more consistent with § 50.36. Section 54.22 now states that the justification for changes or additions to the technical specifications must be contained in the license renewal application.

#### (ii) Conditions of Renewed License

Section 54.33 of the previous rule required that, upon renewal, a licensee maintain the programs and procedures, which would have been reviewed and approved by the NRC staff, for managing ARDUTLR. In addition, § 54.23 established requirements for making changes to previously approved programs and procedures to manage ARDUTLR consistent with the rule changes that delete the term "ARDUTLR."

Considering the proposed amendments associated with the elimination of the term "ARDUTLR," the rule requires programs and procedures to manage the effects of aging for certain systems, structures, and components. However, the Commission will not approve specific programs and procedures as envisioned by the previous license renewal rule (e.g., effective programs). The Commission will review programs and procedures described in the license renewal application and determine whether these programs and procedures provide reasonable assurance that the functionality of systems, structures, and components requiring review will be maintained in the period of extended operation. The license renewal review that would be conducted under this rule may consider all programs and activities to manage the effects of aging that ensure functionality for these systems, structures, and components. A summary description of the programs and activities for managing the effects of aging for the period of extended operation or evaluation of time-limited aging analyses, as appropriate, for these

systems, structures, and components will be placed into the FSAR supplement. Licensee or ratios, and limitations determined to be necessary as part of the license renewal review will continue to be required by the Commission in accordance with § 54.33(b).

The regulatory process will continue to ensure that proposed changes to programs and activities that may affect descriptions in the FSAR will receive adequate review by the licensee and, if appropriate, by the NRC. Therefore, the Commission has deleted the § 54.33(d) requirements for making changes to previously approved programs and procedures to manage ARDUTLR.

#### (iii) Additional Records and Recordkeeping Requirements

Section 54.37 of the previous rule required that the § 50.71(e) required periodic FSAR update:

(1) Include any systems, structures, and components newly identified as important to license renewal after the renewed license is issued;

(2) Identify and provide justification for any systems, structures, and components deleted from the list of systems, structures, and components important to license renewal; and

(3) Describe how ARDUTLR will be managed for those newly identified systems, structures, and components.

The Commission reviewed the requirements for updating the FSAR (§ 54.37(b)) and determined that the requirements needed to be modified. As discussed in Section III.I.(i) of this SOC, the requirement to list systems, structures, and components that are "important to license renewal" in the FSAR supplement that accompanies the renewal application has been deleted. Therefore, in order to be consistent with the controls on technical information discussed in Section III.I.(i), the Commission has revised the requirements for information to be included in the periodic FSAR supplement. For example, the previous requirement to identify and provide justification, in the periodic FSAR update, for any systems, structures, and components deleted from the aforementioned list is no longer necessary and has been deleted from the final rule. In addition, the previous rule's requirement to describe how ARDUTLR will be managed for those newly identified systems, structures, and components has been modified. For newly identified systems, structures, and components that would have required either an aging management review or a time-limited aging analysis, the final rule requires that the licensee

describe in the periodic FSAR update how the effects of aging will be managed to ensure that the systems, structures, and components perform their intended function during the period of extended operation.

Two commenters indicated that the level of detail required by § 54.37(b) (a description of how the effects of aging will be managed in the period of extended operation) is greater than, and therefore inconsistent with, the level of detail required in the FSAR supplement required by § 54.21(c) (a summary description of the programs and activities necessary for managing the effects of aging). The Commission believes that it is important to note that the systems, structures, and components discussed in § 54.37(b) are those newly identified systems, structures, and components that would have been subject to an aging management review in the license renewal process. If identified as part of the license renewal process, information concerning the aging management for these structures and components would have been contained in the application for license renewal. During the license renewal process, the application and the FSAR supplement, together, provide the necessary information and administrative controls to evaluate and help ensure the efficacy of aging programs for these structures and components. After a renewed license is issued, the information in the FSAR supplement serves the dual purposes of (1) Assuring that the licensee has considered relevant technical information regarding the evaluation of aging effects for these newly identified systems, structures, and components and (2) establishing appropriate administrative and regulatory controls on the programs that manage aging for these newly identified systems, structures, and components. Therefore, the Commission concludes that the characterization of the level of detail required in the FSAR supplement for newly identified systems, structures, and components by § 54.37(b) is appropriate.

Section 54.37(c) of the previous rule required that a licensee do the following:

- (1) Submit to the NRC at least annually a list of all changes made to programs for management of ARDUTLR that do not decrease the effectiveness of "effective" programs, with a summary of the justification and
- (2) Maintain documentation for any changes to "effective" programs that are determined not to reduce the effectiveness of the program.

Under this rule, the Commission will review aspects of programs and procedures described in the license renewal application and determine whether these programs and procedures will provide reasonable assurance that the functionality of systems, structures, and components requiring review will be maintained in the period of extended operation. The license renewal review that would be conducted under this rule may consider all programs and activities that manage the effects of aging and ensure functionality for these certain systems, structures, and components. The existing regulatory process, existing licensee oversight activities, and the additional regulatory controls associated with placing a summary description of activities to manage the effects of aging into the FSAR are sufficient to ensure that changes to programs that could decrease the overall effectiveness of the programs to manage the effects of aging and the evaluation of time-limited aging analyses for the systems, structures, and components requiring license renewal review will receive appropriate review by the licensee. Therefore, the Commission has deleted § 54.37(c).

#### IV. General Comments and Responses

(1) One commenter recommended that the NRC perform a full economic analysis for the period of extended operation. The commenter indicated that topics such as the expense involved in monitoring and/or replacing components, the increase in decommissioning costs as plants are operated longer and waste is accumulated, a comparison of the costs for operating the plant for the additional time versus the cost of other sources of power need to be addressed.

The economics of electrical power generation is the responsibility of the individual utility and the Federal or State agencies that are given that authority and responsibility. Generally, a State public utility commission or the Federal Energy Regulatory Commission, along with the utility, have the responsibility and the authority to address economic issues associated with power generation. Furthermore, the Commission's regulatory responsibility (as defined by the Atomic Energy Act, the NRC's organic statute) does not confer upon the Commission primary authority for regulating the economics of nuclear power generation. Under these circumstances, the Commission does not believe that it should perform economic analyses of nuclear power generation as a basis for informing the Commission's licensing decisions. While it is true that the Commission currently addresses the economics of

operating a nuclear power plant in the context of an environmental impact statement (EIS), it should be recognized that these analyses have been conducted in the context of EISs as part of the Commission's process for complying with the mandates of the National Environmental Policy Act (NEPA). However, NEPA does not require such economic analyses. In a separate rulemaking (59 FR 37724) the Commission is considering whether the Commission's current analytical approach should be altered by moving away from economic analyses in EISs and redirecting the NEPA evaluation to focus on environmental impacts. In sum, the Commission is not statutorily required, and does not believe it is necessary, to perform economic analyses of extended operation of nuclear power plant licenses.

(2) NEI commented that an aging management review that involves an issue that is being addressed by the NRC as a GSI or an unresolved safety issue (USI) should not hold up the issuance of a renewed license pending the resolution of the issue.

Resolution of a USI or GSI is general for the set of applicable plants is not necessary for the issuance of a renewed license. GSIs and USIs that do not contain issues related to the license renewal aging management review or time-limited aging evaluation are not subject of review or finding for license renewal. However, designation of an issue as a GSI or USI does not exclude the issue from the scope of the aging management review or time-limited aging evaluation.

For an issue that is both within the scope of the aging management review or time-limited aging evaluation and within the scope of a USI or GSI, there are several approaches which can be used to satisfy the finding required by section 54.29. If an applicable generic resolution has been achieved before issuance of a renewed license, implementation of that resolution could be incorporated within the renewal application. An applicant may choose to submit a technical rationale which demonstrates that the CLB will be maintained until some later point in time in the period of extended operation, at which point one or more reasonable options (e.g., replacement, analytical evaluation, or a surveillance maintenance program) would be available to adequately manage the effects of aging. (An applicant would have to describe its basis for concluding that the CLB is maintained, in the license renewal application, and briefly describe options that are technically feasible during the period of extended

operation to manage the effects of aging, but would not have to preselect which option would be used.) Another approach could be for an applicant to develop an aging management program which, 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 of the license renewal application) which, if approved, would revise the CLB such that the intended function is no longer within the CLB.

(3) Several commenters suggested that as plants age, the regulatory requirements need to be strengthened rather than relaxed. These commenters indicated that the proposed license renewal rule is a relaxation of the previous rule, serving only to provide incentives for applicants, rather than an enhancement to public safety.

The Commission does not agree that regulations must be strengthened simply because a plant ages. The Commission believes that additional regulations should be imposed when there is some reason to believe that current regulation are inadequate. The Commission's regulatory process continuously assesses the need for additional oversight and implements appropriate regulations to ensure public health and safety. Equally important, however, is the Commission's policy to ensure that its regulations promote a stable, efficient, and predictable regulatory environment. Therefore, where the Commission recognizes a more efficient and stable means of achieving a particular level of safety, it strives to implement that approach.

The Commission implemented a license renewal rule because existing regulations did not contain clear guidance on renewals and, further, the Commission believed that current regulations were inadequate to address the effects of aging in the period of extended operation. Upon implementation of the previous license renewal rule, however, the Commission determined that the rule could be amended to create a more efficient and stable license renewal process, while retaining the same degree of safety provided by the previous rule.

(4) Nevada commented that the Commission should be analyzing whether there was any condition, act, or practice that occurred during the period of initial licensing that would affect the period of extended operation. In a broad sense, the regulatory process continuously evaluates the safety status of licensed plants and modifies licensing bases as necessary to ensure that plant operation is not inimical to the public health and safety. As

discussed in the SOC of the previous rule (56 FR at 64951), the Commission's inspection program obtains sufficient information on licensee performance, through direct observation and verification of licensee activities, to determine whether the facility is being operated safely and whether the licensee management control program is effective and to ascertain whether there is a reasonable assurance that the licensee is in compliance with regulatory requirements. Further, as discussed in the SOC for the previous rule (56 FR at 64947), the Commission has a program for the review of operating events at nuclear power plants. The total program offers a high degree of assurance that events that are potentially risk significant or precursors to significant events are being reviewed and resolved expeditiously. Response to events may result in minor followup inspection activities at a single plant up to generic safety improvements at all plants—regardless of license terms. Thus, the Commission continuously analyzes conditions, acts, and practices that could affect safe operation of plants and takes appropriate action.

(5) One commenter asked whether the original rules concerning emergency preparedness are still in effect, even though the proposed rule changes did not mention any revisions to emergency preparedness requirements. The Commission's response is: yes, the previous rules provisions on emergency preparedness are still in effect.

(6) One commenter stated that the rule should be written in language that the average, literate citizen can comprehend. The commenter further states that technical terms, or specialized phraseology whose purpose is to express a precise meaning, legal or otherwise, can and should be fully explained. The Commission agrees with the commenter to the extent that NRC documents should be written so that as many people as possible can comprehend them. The expectation is for all Commission documents to be written as clearly as possible so that they can be easily comprehended. The Commission has taken steps to clarify technical terms and phraseology in the final rule and SOC. For example: the phrase "age-related degradation unique to license renewal" was not well understood and not easily explained; in part because of this the Commission has removed this phrase from the rule.

(7) One commenter claimed that the Commission did not consult with either any environmental group or any members of the general public when the Commission was seeking advice during a public workshop on the proposed

changes to the license renewal rule. Rather, the Commission relied solely on the expertise of representatives of nuclear utilities, industry organizations, architects and engineering firms, consultants and contractors, and Federal and State agencies.

The Commission disagrees. Consistent with the Commission's policy of seeking input from the entire spectrum of the public, the Commission provided ample opportunity for public comment. The Commission held a public workshop on September 30, 1993, to discuss alternative approaches to the license renewal rule. A notice of the public workshop was published in the Federal Register on August 12, 1993. In addition to the Federal Register notice, the NRC explicitly contacted four public interest groups that had previously indicated interest in license renewal. The NRC staff contacted representatives from the Union of Concerned Scientists, the Nuclear Information and Resource Service, the Natural Resources Defense Council, and the Public Citizen Litigation Group. Representatives from the Nuclear Information and Resource Service and the Public Citizen Litigation Group attended the workshop. Written comments from the Ohio Citizens for Responsible Energy, Inc. were also received. The proposed changes to the license renewal rule were published in the Federal Register on September 9, 1994, for public comment. Three public interest groups provided comments: the Public Citizen, the Ohio Citizens for Responsible Energy, Inc., and the Sierra Club. During the upcoming development of implementation guidance (a standard review plan for license renewal and a regulatory guide for license renewal), external NRC meetings will be open to the public and the draft standard review plan for license renewal and the draft regulatory guide for license renewal will be made available for public comment.

(8) NEI stated that 10 CFR 54.23 requires an "environmental report that complies with the requirements of 10 CFR Part 51." 10 CFR 51.53 requires a supplemental environmental report. The wording should be consistent between Parts 51 and 54. The Commission agrees and the Part 54 wording will be changed to be consistent with Part 51.

(9) Two commenters encouraged the creation of implementation guidance in the form of a regulatory guide and a standard review plan. The current NRC effort is focused on the completion of this license renewal rule and the review of the initial license renewal submittals. The NRC intends to develop and issue guidance in the future in the form of a regulatory guide and a standard review

plan, however, the guidance may not be issued prior to the NRC review of a number of submittals.

(10) One commenter suggested that the NRC should require an update of plant environs for parameters such as population density to assure that the original licensing basis is still valid prior to license renewal.

The Commission does not agree that a review of plant environs is necessary as a precondition for license renewal. Aside from such a review being beyond the scope of license renewal, the Commission's regulations in 10 CFR 50.71(e) require a licensee to ensure that the FSAR contains the latest and most accurate information. This requirement includes parameters on plant environs such as population density, which is normally contained in Chapter 2 of the FSAR.

#### V. Public Response to Specific Questions

In the Notice of Proposed Rule (59 FR at 48589), the Commission requested public comment on five specific questions. The Commission appreciates the public's comments on these five questions.

**Discussion.** An aging management review is required for a small subset of structures and components within the scope of license renewal. As described in Section III.f of this SOC, the Commission believes, on the basis of existing regulatory requirements and operating experience, that the aging management review can be limited to "passive," "long-lived" structures and components.

1. Should additional structures and components within the scope of license renewal be explicitly required to receive an aging management review?

2. If so, what would be the bases for requiring such additional structures and components to be subject to an aging management review?

Commenters responded to questions 1 and 2 by stating that additional structures and components not included in the proposed rule require an aging management review, no additional structures and components require an aging management review, and structures and components requiring an aging management review under the proposed rule should be excluded. The Commission has responded to the individual comments on requiring an aging management review for additional structures and components in Section III(d)(v) of this SOC. Comments stating that additional structures and components should be generically excluded from an aging management

review are answered in response to question 3 in this Section.

**Discussion.** The IPA in the proposed amendment to the license renewal rule contains a process to narrow the focus of the aging management review to encompass those structures and components that are "long-lived" and "passive" (see § 54.21(a)(1) (i) and (ii)).

In SECY-84-140, the Commission considered the possibility that redundant, long-lived, passive structures and components could be generically excluded from an aging management review for license renewal. The basis for this consideration was that redundancy is one aspect of a defense-in-depth design philosophy that could provide reasonable assurance that certain single failures would not render systems, structures, or components incapable of performing their intended function(s). The staff reasoned that although simultaneous failures of redundant structures and components are hypothetically possible, the physical variables and the differences in operational and maintenance histories that will influence the incidence and rates of aging degradation between otherwise identical structures and components make simultaneous failures of redundant equipment unlikely. In addition, existing programs and requirements (i.e., maintenance rule and 10 CFR Part 50, Appendix B) would result in activities to determine the root causes for failures and mitigate future occurrences of them.

On further consideration, however, the Commission has recognized, because it cannot generically determine that all licensees have processes, programs, or procedures in place for the timely detection of degraded conditions as a result of aging during the period of extended operation for passive, long-lived structures and components, that the potential exists for reduced reliability and failure of redundant, long-lived, passive structures and components. If the condition of these structures and components were degraded below their CLB (i.e., design bases, including seismic design), without detection and corrective action, a failure of redundant, passive structures and components is possible given, for example, the occurrence of a design-basis seismic event, such that the system may not be able to perform its intended functions. Therefore, without readily monitorable performance and/or condition characteristics to reveal degradation that exceeds CLB levels (as in the case of passive, long-lived structures and components) the Commission believes it inappropriate to permit generic exclusion of redundant,

long-lived, passive structures and components. If, however, an applicant, in the site-specific renewal application, can demonstrate that their facility has specific programs or processes in place to detect ongoing degradation such that failure of redundant, long-lived, passive structures and components is avoided, the Commission may be able to credit such programs and allow redundant, long-lived, passive structures and components to be generically excluded from further aging management review.

3. Is there additional information for the Commission to consider that would satisfy the Commission's concern relative to the detection of degradation in redundant, long-lived, passive structures and components such that failures that might result in loss of system function are unlikely, and to warrant a generic exclusion?

One commenter stated that "built in" redundancy is an essential safety feature and suggested that redundant, passive, long-lived structures and components should not be excluded from an aging management review.

Industry commenters, on the other hand, attempted to provide sufficient justification for generically excluding from an aging management review those components whose failure will not result in a loss of system function. The industry divided these components into two categories: (1) redundant components and (2) small components that can be isolated, such as instrument lines. The industry believes that passive, long-lived components that have designed redundancy are subject to extensive licensee programs that verify structural integrity and functional capability. These extensive programs, together with the established redundancy, ensure that the effects of aging will be detected so that corrective action can be taken before a loss of the system's intended function. The industry believes that the stringent seismic design requirements coupled with current plant programs provides greater assurance that structural integrity and capability of passive components will be maintained during an earthquake. Moreover, the industry believes that the slow, long-term characteristics of the aging process and the fact that this aging process is not occurring at an identical rate in redundant trains, allows degraded conditions to become self-revealing before a loss of the intended system function.

As discussed in the proposed rule amendment, the Commission concluded that passive, long-lived components should be subject to an aging management review because, in general,

functional degradation of these components is not as readily revealable so that the regulatory process and existing license programs may not adequately manage the detrimental effects of aging in the period of extended operation. In their comments on the proposed rule amendment, the industry provided some examples of how aging effects of certain passive structures and components could be considered by the Commission to be adequately managed during the period of extended operation. However, the basis for the aging management programs described in the examples relies on individual licensee programs rather than on design redundancy.

While the industry examples may be a basis for determining that aging of a structure or component is adequately managed in a plant-specific application, a generic determination of acceptability is difficult given the variations among plant designs and programs. However, as the NRC gains more experience with the effects of aging during the period of extended operation and can better define the boundary of adequate aging management for passive, long-lived structures and components, the Commission may consider further narrowing the scope of passive, long-lived structures and components requiring an aging management review.

Additionally, the industry did not adequately address the Commission's concern relative to aging degradation below design bases occurring simultaneously in redundant trains such that an initiating event (e.g., a seismic event) may lead to failure of the intended system function. The industry's argument that aging will not occur at identical rates and that a failure in one redundant train will lead to investigative and corrective actions before the remaining component fails, is not compelling. Absent more detailed information, the Commission cannot preclude the possibility of common mode failures of redundant, passive structures and components. Further, the Commission believes that crediting a regulatory requirement (i.e., redundancy) as a surrogate for an aging management program to ensure a system's intended function exploits the Commission's defense-in-depth philosophy. In addition, this argument is circular because the established redundancy would, in essence, be used to assure continued redundancy in the period of extended operation.

The industry also proposed that the Commission generically exclude from an aging management review certain portions of systems whose failure can either be isolated or whose failure will

not result in the loss of the associated system's intended function. The industry cites small instrument lines and sensors that can be isolated (i.e., manual isolation by operator action) as examples of components that should be excluded from an aging management review using these criteria.

The Commission cannot generically exclude these components from consideration for an aging management review for several reasons. The Commission does not deem it appropriate to generically credit operator action (e.g., manual component isolation), exclusively as adequate aging management for portions of systems that would otherwise require an aging management review. Such an exclusion necessarily presumes that manual valve isolation would occur—a presumption the Commission cannot make. In addition, all "passive", "long-lived" portions of systems that perform an intended function as specified in § 54.4(b) require an aging management review. Instrument lines, for example, typically are "passive", "long-lived" and form part of a system's pressure boundary. The Commission cannot generically exclude these portions of systems from an aging management review because failure of these portions of systems may result in the loss of the system's intended function (e.g., required instrumentation, pressure boundary, flowrate). Therefore, an applicant for license renewal will be required to perform an aging management review for these portions of systems. However, an applicant for license renewal may perform, or may have performed, additional plant-specific analyses that adequately demonstrate that failure of these non-redundant portions of systems will not result in the loss of any of the associated systems' intended functions. In this case, these plant-specific analyses could provide the basis for a license renewal applicant to conclude that these non-redundant portions of systems do not meet the functional scoping criteria of § 54.4(b) and, therefore, are not subject to an aging management review.

**Discussion.** The Commission concluded in the SOC for the current license renewal rule (56 FR 64953; December 13, 1991) that 20 years of operational and regulatory experience provides a licensee with substantial amounts of information and would disclose any plant-specific concerns with regard to age-related degradation. In addition, a license renewal decision with approximately 20 years remaining on the operating license would be reasonable considering the estimated time necessary for utilities to plan for

replacement of retired nuclear power plants. One utility has recently indicated that decisions regarding license renewal made earlier in the current license term may create substantial current-day economic advantages while still providing sufficient plant-specific history. This utility suggested that the earliest date for filing a license renewal application be changed so that a license renewal application can be submitted earlier than 20 years before expiration of the existing operating license. The term of the renewed license would still be limited to 40 years.

4. Is there a sufficient plant-specific history before 20 years of operation as specified in the current rule that provides reasonable assurance that aging concerns would be identified? If not, can reliance on industry-wide experience be used as a basis for considering an application for license renewal before 20 years of operation? What should be the earliest time an applicant can apply for a renewed license?

The NRC received six responses to the question. Four of the six commenters opposed consideration of license renewal applications prior to 20 years of operation. These comments included arguments such as:

(1) Early applications may not allow for the effects of deterioration due to aging to appear in sufficient diversity or intensity for management to acquire a full range of experience in dealing with these problems;

(2) Licensees might apply for renewal over a shorter period before the effects of aging are apparent;

(3) Early applications could negatively impact the review schedule for older plants; and

(4) There is a lack of experience with the maintenance rule. One of these commenters suggested the possibility of approving a license renewal contingent on imposing certain special testing requirements during the final years of the original license term to ensure that substantial physical degradation of passive, long-lived safety-related equipment had not occurred. NEI, while not specifically favoring a rule change allowing early applications, stated that depending on the individual plant and its operating history, there may be sufficient operating history available to provide reasonable assurance that aging concerns can be identified and therefore, an applicant may request an exemption. One commenter (DOE) was in favor of a rule change allowing an early application. DOE stated that, in general, aging effects are apparent after only a few years of operation and that

industry-wide data provides a sound basis to understand and address the effects of aging, even at a plant that has operated only a few years. DOE foresees no technical impediment to license renewal prior to 20 years of operation.

Based on the general nature of the information provided by the commenters, no change to the final rule will be made. The Commission is willing to consider, however, plant-specific exemption requests by those applicants who believe that they may have sufficient information available to justify applying for a renewal license prior to 20 years from the expiration date of the current license.

5. What additional safety, environmental, or economic benefits or concerns, if any, would result from a decision about license renewal made before the 20th year of current plant operation?

The NRC received two responses to this question. NEI felt that a significant economic benefit would likely be derived from license renewal decisions made before the 20th year of operation. However, they stated that the industry cannot estimate the exact benefit because it is likely to vary considerably from plant to plant. NEI also stated that it is clear that knowledge gained from license renewal will enhance the utility's ability to engage in long-range planning and may enable the utility to modify its electrical rates accordingly. DOE added that they were unaware of any safety or environmental concerns that would result from a license renewal decision before the 20th year of operation, other than those issues that would be considered for any license renewal.

No new specific information concerning additional safety, environmental, or economic benefits of license renewal applications before the 20th year was provided by any commenters. Therefore, the Commission has determined not to change Section 54.17.

#### VI. Availability of Documents

Copies of all documents cited in the Supplementary Information section are available for inspection and/or for reproduction for a fee in the NRC Public Document Room, 2120 L Street, N.W. (Lower Level), Washington, DC 20555.

In addition, copies of NUREGs cited in this document may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Mail Stop SSOP, Washington, DC 20402-9328. Copies are also available for purchase from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

#### VII. Finding of No Significant Environmental Impact: Availability

The NRC prepared a draft environmental assessment (EA) for the proposed rule pursuant to the National Environmental Policy Act of 1969 (NEPA), as amended; the regulations issued by the Council on Environmental Quality (40 CFR 1500-1508), and the NRC's regulations (Subpart A of 10 CFR 51). Under NEPA and the NRC's regulations, the Commission must consider, as an integral part of its decisionmaking process on the proposed action, the expected environmental impacts of promulgating the proposed rule and the reasonable alternatives to the action. The NRC concluded that promulgation of the proposed rule would not significantly affect the environment and, therefore, a full environmental impact statement would not be required and a finding of no significant impact (FONSI) could be made. The basis for these conclusions and the finding are summarized below.

The NRC previously assessed the environmental impacts from promulgation of a license renewal rule in NUREG-1398, "Environmental Assessment for the Final Rule on Nuclear Power Plant License Renewal." In this assessment, the NRC concluded that the promulgation of 10 CFR 54 will have no significant impact on the environment. With this assessment as a baseline, the NRC's approach for assessing the environmental impact of the proposed rule centered on analyzing any differences in the expected rule-related actions from the previous rule compared to those under the proposed rule.

The requirements for a renewed license under both the previous rule and the proposed rule are similar. Both approaches could result in the operation of plants up to 20 years beyond the expiration of the initial license. An emphasis would be placed on certain systems, structures, and components undergoing a specific aging management review to provide assurance that the effects of aging are adequately managed, thus ensuring functionality during the period of extended operation. Under both approaches, license renewal applicants must screen plant systems, structures, and components through an IPA to determine which systems, structures, and components will be subject to a license renewal review and then determine whether additional actions are required to manage the effects of aging so that the intended function is maintained. The principal differences between the proposed rule and the previous rule are in (1) the

screening of systems, structures, and components to identify those that must undergo a plant-specific aging management review and (2) the form of this aging management review.

Under the screening of systems, structures, and components that must be further reviewed, the proposed rule effectively narrows the scope of systems, structures, and components subject to an aging management review. In general, the previous rule contained a definition of ARDUTLR that would cause many systems, structures, and components to require further aging management review but would allow existing licensee programs and activities (including the maintenance rule) to serve as a basis for concluding that ARDUTLR will be adequately managed in the period of extended operation. The proposed rule would retain the screening of systems, structures, and components but would reduce the scope of systems, structures, and components requiring review to a narrowly defined group based on an NRC determination, in this rulemaking, of the effectiveness of current licensee programs and activities and NRC requirements that will continue into the period of extended operation. Because the proposed rule has essentially the same results with respect to management of aging effects in the period of extended operation as the previous rule, but provides a more efficient process to achieve these results, the environmental impacts of the proposed rule would be similar to those under the previous rule.

With respect to the form of the aging management review, the proposed rule would establish a clear focus on managing the functionality of systems, structures, and components in the face of detrimental aging effects as opposed to identification and mitigation of aging mechanisms. The Commission concluded that the focus on identification of aging mechanisms is not necessary because regardless of the aging mechanism, only those that lead to degraded component performance or condition (i.e., potential loss of functionality) are of concern. Therefore, the Commission concluded that an aging management review that seeks to ensure a component's functionality is a more efficient and appropriate review. This change only improves the efficiency of the licensee's aging management review. Therefore, the environmental impacts would be similar to those under the previous rule.

The ultimate licensee actions to manage aging in the renewal term under the proposed rule are expected to be similar to those under the previous rule. However, the required activities to

manage the effects of aging will be arrived at more efficiently under the proposed rule. Therefore, the environmental impact of license renewal under the proposed rule would be similar to that for license renewal under the previous rule. Hence, the Commission concluded that the proposed rule would not significantly impact the environment.

The Commission's EA and FONSI for the proposed rule were issued in draft and public comments were solicited. Several public comments were received and are addressed below.

Two commenters stated that the NRC should be required to prepare an EIS for license renewal. In general, these commenters believe that the EIS should include a discussion on the following issues:

- (a) A full description of proposed mitigation measures to counteract reactor degradation due to aging;
- (b) The cumulative effects of an added 20 years of discharge of radioactive cooling waters and/or steam;
- (c) The environmental impacts of prolonged stockpiling of high-level and low-level waste; and
- (d) Plans for public involvement from the first scoping session, through subsequent public hearing.

The Commission has undertaken a review of the environmental impacts of license renewal from two different perspectives. First, for the purposes of evaluating the environmental impacts of a formal regulatory process for license renewal, the NRC prepared NUREG-1398. This environmental assessment served to assess the degree to which the renewal of operating licenses via a formal regulatory process would differ from renewal of operating licenses under existing regulations that do not specify standards for license renewal applications. The environmental assessment discussed the issues of additional waste generation, activities required to address aging degradation in the renewal period, and impacts of radioactive discharges. The Commission concluded in that environmental assessment that a formal license renewal regulation establishing the standards for license renewal applications would result in no significant impact from those impacts expected from renewal without a formal license renewal process. The staff performed an additional environmental assessment for the proposed amendments to the previous license renewal rule and concluded, consistent with the previous environmental assessment, that the amended rule would result in no significant impact.

Second, for the purpose of evaluating the environmental impacts associated with granting a renewed license, the NRC is preparing "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (GEIS). NUREG-1437, as part of its amendments to 10 CFR 51. The GEIS addresses, in generic fashion, the impacts associated with continued operation of a nuclear plant beyond its original license, including the impacts of activities to counter the effects of aging, the impacts of high-level and low-level waste, and the effects of radioactive discharges. In addition, the Commission has proposed amendments to 10 CFR 51 that would require that a supplement to the GEIS be prepared for individual license renewal applications to address those impacts that could not be generically evaluated in the GEIS. This supplement would be issued in draft for public comment.

One commenter stated that the draft FONSI for the proposed rule is inappropriate. The commenter stated that the NRC is creating incentives for the licensees to seek license renewal by easing rules. The commenter stated that the reduction in review of the new rule will result in significant environmental impacts. The Commission disagrees. The FONSI for the proposed rule was based on the FONSI from the previous license renewal rule (see NUREG-1398) and an analysis of the difference between the previous rule and the proposed rule. As discussed in the EA for the proposed rule, the amended rule will result in the same activities required to adequately manage the effects of aging in the period of extended operation as in the previous rule; however, the method for arriving at these activities will be more efficient. This efficiency is gained because the NRC is generically crediting, in this rule, the existing aging management programs for which the applicant would have had to describe and justify under the previous rule. The Commission does not agree with the commenter that the amendments to the previous rule represent any less stringent a review. The environmental impacts from the amendments to the license renewal rule are expected to be the same as the previous rule because the ultimate actions to manage aging will be the same. Therefore, consistent with the finding of no significant impact for the previous rule, the Commission finds this final rule will result in no significant impact.

One comment stated that the waste confidence decision assumptions can not be transferred to license renewal. The waste confidence decision is not

relevant to 10 CFR 54 or any of its amendments. The formal requirements that an applicant for renewal must meet and the information that must be submitted for the NRC to conduct a license renewal review are established in 10 CFR 54. The environmental assessment for the previous license renewal rule (NUREG-1398) assessed the degree to which the renewal of operating licenses via a formal regulatory process would differ from renewal of operating licenses under existing regulations that did not specify standards for license renewal. The Commission concluded, in that environmental assessment, that the impacts from spent fuel storage under a formal license renewal process would not differ from the spent fuel impacts from license renewal under existing regulations that did not specify standards for renewals. This conclusion does not rely on the Commission's waste confidence decision.

Upon considering these comments, the Commission has determined that the commenter's concerns do not alter the proposed finding in the EA for the proposed rule. Consequently, the Commission has determined under the NEPA, and the Commission's regulations in Subpart A of 10 CFR Part 51, that this rule is not a major Federal action significantly affecting the quality of the human environment; therefore, an environmental impact statement is not required. This is because this rule will result in the same activities to adequately manage the effects of aging in the period of extended operation as in the previous rule, although, it arrives at these activities in a more efficient manner. The EA and FONSI on which this determination is based are available for inspection at the NRC Public Document Room, 2120 L Street N.W. (Lower Level), Washington, DC. Single copies of the environmental assessment may be obtained from John P. Moulton, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555, (301) 415-1106.

#### VIII. Paperwork Reduction Act Statement

This final rule amends information collection requirements that are subject to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). These requirements were approved by the Office of Management and Budget, approval number 3150-0155.

The public reporting burden for this collection of information is estimated to average 94,000 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the

data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Information and Records Management Branch (T6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0155), Office of Management and Budget, Washington, DC 20503.

#### IX. Regulatory Analysis

The NRC prepared a draft regulatory analysis of the values and impacts of the proposed rule and of a set of significant alternatives. The draft regulatory analysis was placed in the Commission's public document room for review by interested members of the public. In addition, a summary of the findings and conclusions of the regulatory analysis were published in the *Federal Register* (59 FR 46591, September 9, 1994) concurrent with the proposed rule. No comments were received on the regulatory analysis. The regulatory analysis has been finalized and is available for inspection in the NRC Public Document Room, 2120 L Street NW (Lower Level), Washington DC. Single copies of the analysis may be obtained from Joseph J. Mate, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington DC 20555, (301) 415-1109.

#### X. Regulatory Flexibility Act Certification

As required by the Regulatory Flexibility Act of 1980, (5 U.S.C. 605) (b)(1), the Commission certifies that this rule does not have a significant economic impact upon a substantial number of small entities. The final rule sets forth the application procedures and the technical requirements for renewed operating licenses for nuclear power plants. The owners of nuclear power plants do not fall within the definition of small business entities as defined in Section 3 of the Small Business Act (15 U.S.C. 632), the Small Business Size Standards of the Small Business Administration (13 CFR Part 121), or the Commission's Size Standards (56 FR 56671, November 6, 1991).

#### XI. Non-Applicability of the Backfit Rule

This rule, like the previous license renewal rule, addresses the procedural and technical requirements for obtaining a renewed operating license for nuclear power plants. Although this

amendment constitutes a change to an existing regulation, the NRC has determined that the backfit rule, 10 CFR 50.109, does not apply because this amendment only affects prospective applicants for license renewal. The primary impetus for the backfit rule was "regulatory stability." Once the Commission decides to issue a license, the terms and conditions for operating under that license would not be changed arbitrarily post hoc. As the Commission expressed in the preamble for 10 CFR 52, which retrospectively changed the requirements for receiving design certifications, the backfit rule—

(Was not intended to apply to every regulatory action which changes settled expectations. Clearly, the backfit rule would not apply to a rule which imposed more stringent requirements on all future applicants for construction permits, even though such a rule might arguably have an adverse impact on a person who was considering applying for a permit but had not done so yet. In this latter case, the backfit rule protects the construction permit holder, but not the prospective applicant, or even the present applicant. (54 FR 13385-86; April 18, 1989).

Regulatory stability from a backfitting standpoint is not a relevant issue with respect to this rule. There are no licensees currently holding renewed nuclear power plant operating licenses who would be affected by this rule. No applications for license renewal have been docketed. It is also unlikely that any license renewal applications will be submitted before this rule becomes effective. Consequently, there are no valid licensee or applicant expectations that may be changed regarding the terms and conditions for obtaining a renewed operating license. Accordingly, this rule does not constitute a "backfit" as defined in 10 CFR 50.109(a)(1).

Furthermore, one reason the Commission is amending 10 CFR Part 54 is because of the concerns of nuclear power plant licensees who were dissatisfied with the previous requirements in 10 CFR Part 54 and urged the Commission to modify the rule to address their concerns. Under this circumstance, the policy objective of the backfit rule would not be served by undertaking a backfit analysis. Regulatory and technical alternatives for addressing the concerns with the previous 10 CFR Part 54 were analyzed and considered in the regulatory analysis that has been prepared for this rule. Preparation of a separate backfit statement would not provide any substantial additional benefit. Therefore, the Commission has determined that a backfit analysis

pursuant to 10 CFR 50.109 need not be prepared for this rule.

NEI commented that the NRC should review its determination regarding the application of backfit protection to license renewal. Although not clearly stated in its comments, NEI appears to argue that the protection afforded by 10 CFR 50.109 should apply in individual license renewal proceedings when the NRC seeks to impose requirements that go beyond what is necessary for adequately managing the effects of aging on intended functions in the period of extended operation (i.e., enhancements). NEI stated that in such cases, the NRC should perform an analysis to demonstrate that the proposed additional requirements will result in substantial increase in overall safety and that direct and indirect costs are justified relative to the safety benefit. Furthermore, NEI believes that if there are two or more means of adequately managing the effects of aging, cost must be taken into account in selecting an alternative.

The industry's desire for a special provision in the rule that would impose backfit-style requirements on the Commission's review is neither necessary nor appropriate. The intent of the license renewal rule is clear—to ensure that the effects of aging on functionality of certain systems, structures, and components are adequately managed in the period of extended operation. The Commission does not intend to impose requirements on a licensee that go beyond what is necessary to adequately manage aging effects. The focus of the industry's concern appears to be on potential disagreements between the Commission and renewal applicants regarding what is or is not considered "adequate" for managing the effects of aging. The Commission understands the industry's concern, but does not believe it appropriate or consistent with current practice to further limit (i.e., beyond the limits established by the rule) the NRC staff in its review of an application for a renewal license.

Additionally, the Commission sees no justification for requiring a consideration of costs among alternative aging management programs. The renewal process is designed such that a renewal applicant proposes the alternatives it believes manages the effects of aging for those structures and components defined by the rule. The NRC staff has the responsibility of reviewing the applicant's proposals and determining whether they are adequate such that there is reasonable assurance that activities authorized by the renewed license will continue to be

conducted in accordance with the CLB. The Commission believes that this license renewal review must necessarily be performed without regard to cost.

#### List of Subjects

##### 10 CFR Part 2

Administrative practice and procedure, Antitrust, Byproduct material, Classified information, Environmental protection, Nuclear materials, Nuclear power plants and reactors, Penalties, Sex discrimination, Source material, Special nuclear material, Waste treatment and disposal.

##### 10 CFR Part 51

Administrative practice and procedure, Environmental impact statement, Nuclear materials, Nuclear power plants and reactors, Reporting and recordkeeping requirements.

##### 10 CFR Part 54

Administrative practice and procedure, Aging, Effects of aging, Time-limited aging analyses, Backfitting, Classified information, Criminal penalties, Environmental protection, Nuclear power plants and reactors, Reporting and recordkeeping requirements.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and 5 U.S.C. 552 and 553, the Commission is adopting the following amendments to 10 CFR Parts 2, 51, and 54.

## PART 2—RULES OF PRACTICE FOR DOMESTIC LICENSING PROCEEDINGS

1. The authority citation for Part 2 is revised to read as follows:

Authority: Secs. 161, 181, 68 Stat. 948, 953, as amended (42 U.S.C. 2201, 2231); sec. 191, as amended, Pub. L. 87-615, 78 Stat. 409 (42 U.S.C. 2241); sec. 201, 68 Stat. 1242, as amended (42 U.S.C. 5841); 5 U.S.C. 552, Section 2 101 also issued under secs. 53, 62, 63, 61, 103, 104, 105, 68 Stat. 930, 932, 933, 935, 936, 937, 938, as amended (42 U.S.C. 2073, 2092, 2093, 2111, 2133, 2134, 2135), sec. 114(f), Pub. L. 97-425, 96 Stat. 2213, as amended (42 U.S.C. 10134(f)), sec. 102, Pub. L. 91-190, 83 Stat. 853, as amended (42 U.S.C. 4332); sec. 301, 68 Stat. 1248 (42 U.S.C. 5871); Sections 2 102, 2 103, 2 104, 2 105, 2 721 also issued under secs. 102, 103, 104, 105, 183, 189, 68 Stat. 936, 937, 938, 954, 955, as amended (42 U.S.C. 2132, 2133, 2134, 2135, 2233, 2239). Section 2 105 also issued under Pub. L. 97-415, 96 Stat. 2073 (42 U.S.C. 2239). Sections 2 200-2 206 also issued under secs. 161b, i, o, 162, 186, 234, 68 Stat. 948-951, 955, 83 Stat. 444, as amended (42 U.S.C. 2201(b), (i), (o), 2236, 2282); sec. 206, 68 Stat. 1246 (42 U.S.C. 5846). Sections 2.600-2.606 also issued

under sec. 102, Pub. L. 91-190, 83 Stat. 853, as amended (42 U.S.C. 4332). Sections 2 700a, 2 719 also issued under 5 U.S.C. 554. Sections 2 754, 2 760, 2 770, 2 780, also issued under 5 U.S.C. 557. Section 2 764 and Table 1A of Appendix C are also issued under secs. 135, 141, Pub. L. 97-425, 96 Stat. 2232, 2241 (42 U.S.C. 10155, 10161). Section 2 790 also issued under sec. 103, 68 Stat. 936, as amended (42 U.S.C. 2133) and 5 U.S.C. 552. Sections 2.800 and 2.808 also issued under 5 U.S.C. 553. Section 2 809 also issued under 5 U.S.C. 553 and sec. 29, Pub. L. 85-256, 71 Stat. 579, as amended (42 U.S.C. 2039). Subpart K also issued under sec. 189, 68 Stat. 955 (42 U.S.C. 2239); sec. 134, Pub. L. 97-425, 96 Stat. 2233 (42 U.S.C. 10154). Subpart L also issued under sec. 189, 68 Stat. 955 (42 U.S.C. 2239). Appendix A also issued under sec. 6, Pub. L. 91-560, 84 Stat. 1473 (42 U.S.C. 2135). Appendix B also issued under sec. 10, Pub. L. 99-240, 99 Stat. 1842 (42 U.S.C. 2021b et seq.).

2. In § 2.758, paragraphs (b) and (e) are revised to read as follows:

§ 2.758 Consideration of Commission rules and regulations in adjudicatory proceedings.

(b) A party to an adjudicatory proceeding involving initial or renewal licensing subject to this subpart may petition that the application of a specified Commission rule or regulation or any provision thereof, of the type described in paragraph (a) of this section, be waived or an exception made for the particular proceeding. The sole ground for petition for waiver or exception shall be that special circumstances with respect to the subject matter of the particular proceeding are such that the application of the rule or regulation (or provision thereof) would not serve the purposes for which the rule or regulation was adopted. The petition shall be accompanied by an affidavit that identifies the specific aspect or aspects of the subject matter of the proceeding as to which the application of the rule or regulation (or provision thereof) would not serve the purposes for which the rule or regulation was adopted, and shall set forth with particularity the special circumstances alleged to justify the waiver or exception requested. Any other party may file a response thereto, by counter affidavit or otherwise.

(e) Whether or not the procedure in paragraph (b) of this section is available, a party to an initial or renewal licensing proceeding may file a petition for rulemaking pursuant to § 2.802.

## PART 51—ENVIRONMENTAL PROTECTION REGULATIONS FOR DOMESTIC LICENSING AND RELATED REGULATORY FUNCTIONS

3. The authority citation for Part 51 is revised to read as follows:

Authority: Sec. 161, 68 Stat. 948, as amended; Sec. 1701, 106 Stat. 2951, 2952, 2953, (42 U.S.C. 2201, 2297f, secs. 201, as amended, 202, 88 Stat. 1242, as amended, 1244 (42 U.S.C. 5841, 5842). Subpart A also issued under National Environmental Policy Act of 1969, secs. 102, 104, 105, 83 Stat. 853-854, as amended (42 U.S.C. 4332, 4334, 4335); and Pub. L. 95-604, Title II, 92 Stat. 3033-3041; and sec. 193, Pub. L. 101-575, 104 Stat. 2835, 42 U.S.C. 2243). Sections 51.20, 51.30, 51.60, 51.61, 51.80, and 51.97 also issued under secs. 135, 141, Pub. L. 97-425, 96 Stat. 2232, 2241, and sec. 148, Pub. L. 100-203, 101 Stat. 1330-223 (42 U.S.C. 10155, 10161, 10168). Section 51.22 also issued under sec. 274.73 Stat. 688, as amended by 92 Stat. 3036-3038 (42 U.S.C. 2021) and under Nuclear Waste Policy Act of 1982, sec. 121, 96 Stat. 2228 (42 U.S.C. 10141). Sections 51.43, 51.67, and 51.109 also under Nuclear Waste Policy Act of 1982, sec. 114(f), 96 Stat. 2216, as amended (42 U.S.C. 10134(f)).

4. In § 51.22, paragraph (c)(3) is revised to read as follows:

§ 51.22 Criterion for categorical exclusion: Identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review.

(c) \* \* \*

(3) Amendments to Parts 20, 30, 31, 32, 33, 34, 35, 39, 40, 51, 54, 60, 61, 70, 71, 72, 73, 74, 81 and 100 of this chapter which relate to—

(i) Procedures for filing and reviewing applications for licenses or construction permits or other forms of permission or for amendments to or renewals of licenses or construction permits or other forms of permission;

(ii) Recordkeeping requirements; or

(iii) Reporting requirements; and

(iv) Actions on petitions for rulemaking relating to these amendments.

5. Part 54 is revised to read as follows:

## PART 54—REQUIREMENTS FOR RENEWAL OF OPERATING LICENSES FOR NUCLEAR POWER PLANTS

### General Provisions

#### Sec.

#### 54.1 Purpose

#### 54.3 Definitions

#### 54.4 Scope

#### 54.5 Interpretations

#### 54.7 Written communications

#### 54.9 Information collection requirements

#### OMB approval

- 54.11 Public inspection of applications.
- 54.13 Completeness and accuracy of information.
- 54.15 Specific exemption.
- 54.17 Filing of application.
- 54.19 Contents of application—general information.
- 54.21 Contents of application—technical information.
- 54.22 Contents of application—technical specifications.
- 54.23 Contents of application—environmental information.
- 54.25 Report of the Advisory Committee on Reactor Safeguards.
- 54.27 Hearings.
- 54.29 Standards for issuance of a renewed license.
- 54.30 Matters not subject to a renewal review.
- 54.31 Issuance of a renewed license.
- 54.33 Continuation of CLB and conditions of renewed license.
- 54.35 Requirements during term of renewed license.
- 54.37 Additional records and recordkeeping requirements.
- 54.41 Violations.
- 54.43 Criminal penalties.

Authority: Secs. 102, 103, 104, 161, 181, 182, 183, 186, 189, 68 Stat. 936, 937, 938, 948, 953, 954, 955, as amended, sec. 7, 1, 83 Stat. 1244, as amended (42 U.S.C. 2132, 2133, 2134, 2135, 2201, 2232, 2233, 2236, 2239, 2282); secs. 201, 202, 206, 88 Stat. 1242, 1244, as amended (42 U.S.C. 5841, 5842).

#### General Provisions

##### § 54.1 Purpose.

This part governs the issuance of renewed operating licenses 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).

##### § 54.3 Definitions.

(a) As used in this part,

*Current licensing basis (CLB)* is the set of NRC requirements applicable to a specific plant and a licensee's written commitments for ensuring compliance with and operation within applicable NRC requirements and the plant-specific design basis (including all modifications and additions to such commitments over the life of the license) that are docketed and in effect. The CLB includes the NRC regulations contained in 10 CFR Parts 2, 19, 20, 21, 26, 30, 40, 50, 51, 54, 55, 70, 72, 73, 100 and appendices thereto; orders; license conditions; exemptions; and technical specifications. It also includes the plant-specific design-basis information defined in 10 CFR 50.2 as documented in the most recent final safety analysis report (FSAR) as required by 10 CFR 50.71 and the licensee's commitments remaining in effect that were made in

docketed licensing correspondence such as licensee responses to NRC bulletins, generic letters, and enforcement actions, as well as licensee commitments documented in NRC safety evaluations or licensee event reports.

*Integrated plant assessment (IPA)* is a licensee assessment that demonstrates that a nuclear power plant facility's structures and components requiring aging management review in accordance with § 54.21(a) for license renewal have been identified and that the effects of aging on the functionality of such structures and components will be managed to maintain the CLB such that there is an acceptable level of safety during the period of extended operation.

*Nuclear power plant* means a nuclear power facility of a type described in 10 CFR 50.21(a) or 50.22.

*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.

(b) All other terms in this part have the same meanings as set out in 10 CFR 50.2 or Section 2 of the Atomic Energy Act, as applicable.

##### § 54.4 Scope.

(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 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 10 CFR Part 100 guidelines.

(2) All nonsafety-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 (10 CFR 50.61), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

(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.

##### § 54.5 Interpretations.

Except as specifically authorized by the Commission in writing, no interpretation of the meaning of the regulations in this part by any officer or employee of the Commission other than a written interpretation by the General Counsel will be recognized to be binding upon the Commission.

##### § 54.7 Written communications.

All applications, correspondence, reports, and other written communications shall be filed in accordance with applicable portions of 10 CFR 50.4.

##### § 54.9 Information collection requirements: OMB approval.

(a) The Nuclear Regulatory Commission has submitted the information collection requirements contained in this part to the Office of Management and Budget (OMB) for approval as required by the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). OMB has approved the information collection requirements contained in this part under control numbers 150–0155.

(b) The approved information collection requirements contained in this part appear in §§ 54.13, 54.17, 54.19, 54.21, 54.22, 54.23, 54.33, and 54.37.

##### § 54.11 Public inspection of applications.

Applications and documents submitted to the Commission in connection with renewal applications may be made available for public inspection in accordance with the provisions of the regulations contained in 10 CFR Part 2.

**Completeness and accuracy of information.**

Information provided to the Commission by an applicant for a license or information required by or by the Commission's rules, orders, or license conditions must be maintained by the applicant so that it must be complete and accurate in all material respects. An applicant shall notify the Commission of information identified by the applicant as having, for the activity, a significant impact on public health and safety or defense and security. An applicant violates this paragraph only if it fails to notify the Commission of information that the applicant has identified as having a significant impact on public health or common defense and security. Information must be provided by the applicant within 2 working days of the receipt of the information. This paragraph is not applicable to information that is already required to be provided to the Commission by other regulatory requirements.

**Exemptions.**

Exemptions from the requirements of this section are granted by the Commission in accordance with 10 CFR

**Application.**

Information of an application for a license must be in accordance with 10 CFR Part 2 and 10 CFR 50.30.

The applicant must be a citizen of the United States, or a foreign citizen, or an entity known or controlled, owned, controlled, or operated by a foreign government, is for and obtain a license.

An application for a renewed license must be submitted to the Commission no later than 20 years before the expiration of the operating license.

An applicant may combine an application for a renewed license with an application for other kinds of licenses. An applicant may incorporate by reference into its application for a license or information any statements, reports, or documents filed with the Commission and identified that the applicant has specific information that contains information for defense and security 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).

(g) 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.

**§ 54.19 Contents of application—general information.**

(a) Each application must provide the information specified in 10 CFR 50.33(a) through (e), (h), and (i). Alternatively, the application may incorporate by reference other documents that provide the information required by this section.

(b) Each application must include information concerning changes to the standard indemnity agreement, 10 CFR 140.92, Appendix B, to account for the expiration term of the proposed renewed license.

**§ 54.21 Contents of application—technical information.**

Each application must contain the following information:

(a) An integrated plant assessment (IPA). The IPA must—

(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.

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

(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.

(b) CLB changes during NRC review of the 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.

(c) An evaluation of time-limited aging analyses.

(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.

(2) A list must be provided of 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.

(d) An FSAR supplement. The FSAR supplement for the facility must contain a summary description of the programs and activities for managing the effects of aging and the evaluation of time-limited aging analyses for the period of extended operation determined by paragraphs (a) and (c) of this section, respectively.

**§ 54.22 Contents of application—technical specifications.**

Each application must include any technical specification changes or additions necessary to manage the effects of aging during the period of extended operation as part of the renewal application. The justification for changes or additions to the technical specifications must be contained in the license renewal application.

**§ 54.23 Contents of application—environmental information.**

Each application must include a supplement to the environmental report that complies with the requirements of Subpart A of 10 CFR Part 51.

**§ 54.25 Report of the Advisory Committee on Reactor Safeguards.**

Each renewal application will be referred to the Advisory Committee on Reactor Safeguards for a review and report. Any report will be made part of the record of the application and made available to the public, except to the extent that security classification prevents disclosure.

**§ 54.27 Hearings.**

A notice of an opportunity for a hearing will be published in the Federal Register in accordance with 10 CFR 2.105. In the absence of a request for a hearing filed within 30 days by a person whose interest may be affected, the Commission may issue a renewed operating license without a hearing upon 30-day notice and publication once in the Federal Register of its intent to do so.

**§ 54.29 Standards for issuance of a renewed license.**

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 § 2.758 have been addressed.

**§ 54.30 Matters not subject to a renewal review.**

(a) If the reviews required by § 54.21 (a) or (c) show that there is not reasonable assurance during the current license term that licensed activities will be conducted in accordance with the CLB, then the licensee shall take measures under its current license, as appropriate, to ensure that the intended function of those systems, structures or components will be maintained in accordance with the CLB throughout the term of its current license.

(b) The licensee's compliance with the obligation under Paragraph (a) of this section to take measures under its current license is not within the scope of the license renewal review.

**§ 54.31 Issuance of a renewed license.**

(a) A renewed license will be of the class for which the operating license currently in effect was issued.

(b) A renewed license will be issued for a fixed period of time, which is the sum of the additional amount of time beyond the expiration of the operating license (not to exceed 20 years) that is requested in a renewal application plus the remaining number of years on the operating license currently in effect. The term of any renewed license may not exceed 40 years.

(c) A renewed license will become effective immediately upon its issuance, thereby superseding the operating license previously in effect. If a renewed license is subsequently set aside upon further administrative or judicial appeal, the operating license previously in effect will be reinstated unless its term has expired and the renewal application was not filed in a timely manner.

(d) A renewed license may be subsequently renewed in accordance with all applicable requirements.

**§ 54.33 Continuation of CLB and conditions of renewed license.**

(a) Whether stated therein or not, each renewed license will contain and otherwise be subject to the conditions set forth in 10 CFR 50.54.

(b) Each renewed license will be issued in such form and contain such conditions and limitations, including technical specifications, as the Commission deems appropriate and necessary to help ensure that systems, structures, and components subject to review in accordance with § 54.21 will

continue to perform their intended functions for the period of extended operation. In addition, the renewed license will be issued in such form and contain such conditions and limitations as the Commission deems appropriate and necessary to help ensure that systems, structures, and components associated with any time-limited aging analyses will continue to perform their intended functions for the period of extended operation.

(c) Each renewed license will include those conditions to protect the environment that were imposed pursuant to 10 CFR 50.36b and that are part of the CLB for the facility at the time of issuance of the renewed license. These conditions may be supplemented or amended as necessary to protect the environment during the term of the renewed license and will be derived from information contained in the supplement to the environmental report submitted pursuant to 10 CFR Part 51, as analyzed and evaluated in the NRC record of decision. The conditions will identify the obligations of the licensee in the environmental area, including, as appropriate, requirements for reporting and recordkeeping of environmental data and any conditions and monitoring requirements for the protection of the nonaquatic environment.

(d) The licensing basis for the renewed license includes the CLB, as defined in § 54.3(a); the inclusion in the licensing basis of matters such as license commitments does not change the status of those matters unless specifically ordered pursuant to paragraph (b) or (c) of this section.

**§ 54.35 Requirements during term of renewed license.**

During the term of a renewed license, licensees shall be subject to and shall continue to comply with all Commission regulations contained in 10 CFR Parts 2, 19, 20, 21, 26, 30, 40, 50, 51, 54, 55, 70, 72, 73, and 100, and the appendices to these parts that are applicable to holders of operating licenses.

**§ 54.37 Additional records and recordkeeping requirements.**

(a) The licensee shall retain in an auditable and retrievable form for the term of the renewed operating license all information and documentation required by, or otherwise necessary to document compliance with, the provisions of this part.

(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. Thus 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.

#### § 54.41 Violations.

(a) The Commission may obtain an injunction or other court order to prevent a violation of the provisions of the following acts—

(1) The Atomic Energy Act of 1954, as amended.

(2) Title II of the Energy Reorganization Act of 1974, as amended or

(3) A regulation or order issued pursuant to those acts.

(b) The Commission may obtain a court order for the payment of a civil penalty imposed under Section 234 of the Atomic Energy Act—

(1) For violations of the following—

(i) Sections 53, 57, 62, 63, 61, 82, 101, 103, 104, 107, or 109 of the Atomic Energy Act of 1954, as amended;

(ii) Section 206 of the Energy Reorganization Act;

(iii) Any rule, regulation, or order issued pursuant to the sections specified in paragraph (b)(1)(i) of this section;

(iv) Any term, condition, or limitation of any license issued under the sections specified in paragraph (b)(1)(i) of this section.

(2) For any violation for which a license may be revoked under Section 186 of the Atomic Energy Act of 1954, as amended.

#### § 54.43 Criminal penalties.

(a) Section 223 of the Atomic Energy Act of 1954, as amended, provides for criminal sanctions for willful violations of, attempted violation of, or conspiracy to violate, any regulation issued under sections 161b, 161i, or 161o of the Act. For purposes of section 223, all the regulations in Part 54 are issued under one or more of sections 161b, 161i, or 161o, except for the sections listed in paragraph (b) of this section.

(b) The regulations in Part 54 that are not issued under Sections 161b, 161i, or 161o for the purposes of Section 223 are as follows: §§ 54.1, 54.3, 54.4, 54.5, 54.7, 54.9, 54.11, 54.15, 54.17, 54.19, 54.21, 54.22, 54.23, 54.25, 54.27, 54.29, 54.31, 54.41, and 54.43.

Dated at Rockville, Maryland, this 1st day of May, 1995.

For the Nuclear Regulatory Commission,  
John C. Hayla,

Secretary of the Commission.

[FR Doc. 95-11136 Filed 5-5-95; 8:45 am]

BELUNG CODE 7300-01-P

## SMALL BUSINESS ADMINISTRATION

### 13 CFR Part 123

#### Disaster—Waiver of Judgment Lien Restriction

AGENCY: Small Business Administration.

ACTION: Final rule.

**SUMMARY:** This final rule applies only to disaster loan assistance. It will enable SBA to waive, for good cause shown, the restriction in the Federal Debt Collection Procedures Act of 1990 prohibiting debtors on whose property the United States has an outstanding judgment lien from receiving disaster loan assistance from the Federal Government.

**EFFECTIVE DATE:** This regulation is effective on May 8, 1995.

**FOR FURTHER INFORMATION CONTACT:**

Bernard Kulik at 202/205-6734, Associate Administrator for Disaster Assistance, U.S. Small Business Administration, 409 Third Street SW., Washington, DC 20416.

**SUPPLEMENTARY INFORMATION:** The Federal Debt Collection Procedures Act of 1990 (28 U.S.C. 3201(e)) provides that a debtor who owns property which is subject to a judgment lien for a debt owed to the United States shall not be eligible to receive any grant or loan which is made, insured, guaranteed or financed directly or indirectly by the United States. It also provides that such debtor shall not be eligible to receive funds directly from the Federal Government in any program, except funds to which the debtor is entitled as beneficiary, until the judgment is paid in full or otherwise satisfied. However, the statute permits any agency responsible for such grants or loans to promulgate regulations to allow for waivers of this restriction. As an agency authorized to provide several forms of assistance proscribed by this restriction, including disaster loan assistance and other types of direct and guaranteed loans, SBA also has the waiver authority conferred by the statute.

SBA recognizes that disaster losses may strain the financial resources of responsible debtors to such extent as to prevent them from meeting their financial obligations to the United States. Such losses also may prevent debtors who have been complying with agreements to satisfy one or more judgments in favor of the United States from continuing to comply with the terms of those agreements. Therefore, by publication in the Federal Register on June 29, 1994, 59 FR 33456, SBA proposed to issue a regulation permitting it to waive the restriction on

eligibility for physical and economic injury disaster assistance provided under section 7(b)(1) and (2) of the Small Business Act, 15 U.S.C. 635(b)(1) and (2), where there exists good cause to do so.

The proposed regulation applied to applicants for disaster assistance who have outstanding judgment liens in favor of SBA or in favor of other agencies. It identified two nonexclusive instances in which good cause will ordinarily be found to exist, both of them involving adverse circumstances occasioned by the disaster for which the assistance is sought.

Waivers would be granted denying the eligibility review of an application for either physical or economic injury disaster assistance, but only upon a demonstration of good cause by the applicant. Examples of good cause include, but are not limited to: (1) Delinquencies leading to a judgment lien, which are caused by a disaster, whether the original debt was incurred prior to or after the disaster, and (2) defaults in any agreement to satisfy a judgment lien, which are caused by a disaster, whether the agreement has been made with SBA, another creditor agency, or any other Federal entity holding the lien, such as the Resolution Trust Corporation or the Federal Deposit Insurance Corporation. In the case of agreements with other agencies, SBA will not waive the restriction on eligibility until the appropriate Federal entity has certified that the debtor had made adhering satisfactorily to the terms of the agreement prior to the commencement date of the disaster.

The proposed regulation contemplates that SBA's Associate Administrator for Disaster Assistance, or his/her designee, will make the determination as to whether good cause for waiving the restriction has been demonstrated by the applicant. Although such determinations are subject to the provisions of § 123.12 governing requests for reconsideration, no appeal from an adverse determination is contemplated.

SBA received no comments from the public in response to the June 29, 1994, Notice of Proposed Rulemaking. Therefore, by this publication, SBA is finalizing the rule as proposed.

**Compliance With Executive Orders 12866, 12812 and 12778:** the Regulatory Flexibility Act, 5 U.S.C. 601 et seq.; and The Paperwork Reduction Act, 44 U.S.C. CH 35

SBA submitted this final rule to the Office of Management and Budget for purposes of Executive Order 12866

**APPENDIX B**

**TYPICAL STRUCTURE ,COMPONENT, AND COMMODITY GROUPINGS AND  
ACTIVE/PASSIVE DETERMINATIONS  
FOR THE INTEGRATED PLANT ASSESSMENT**

TYPICAL STRUCTURE COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10  
Revision 0  
March 1, 1996

ITEM	CATEGORY	STRUCTURE, COMPONENT, OR COMMODITY GROUPING	STRUCTURE, COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
1	Structures	Category I Structures	Yes
2		Primary Containment Structure	Yes
3		Intake Structures	Yes
4		Intake Canal	Yes
5		Other Non-Category I Structures Within the Scope of License Renewal	Yes
6		Equipment Supports and Foundations	Yes
7		Structural Bellows	Yes
8		Controlled Leakage Doors	Yes
9		Penetration Seals	Yes

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure component or commodity grouping is active or passive

TYPICAL STRUCTURE, COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10

Revision 0

March 1, 1996

ITEM	CATEGORY	STRUCTURE, COMPONENT, OR COMMODITY GROUPING	STRUCTURE, COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
10	Structures (cont'd)	Compressible Joints and Seals	Yes
11		Fuel Pool and Sump Liners	Yes
12		Concrete Curbs	Yes
13		Offgas Stack and Flue	Yes
14		Fire Barriers	Yes
15		Pipe Whip Restraints and Jet Impingement Shields	Yes
16		Electrical and Instrumentation and Control Penetration Assemblies	Yes
17		Instrument Racks, Frames, Panels, and Enclosures	Yes
18		Electrical Panels, Racks, Cabinets, and Other Enclosures	Yes

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure, component, or commodity grouping is active or passive

TYPICAL STRUCTURE, COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10  
Revision 0  
March 1 1996

ITEM	CATEGORY	STRUCTURE, COMPONENT, OR COMMODITY GROUPING	STRUCTURE, COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
	Structures (cont'd)	Cable Trays and Supports	
19			Yes
		Conduit	
20			Yes
		Tube Track	
21			Yes
		Reactor Vessel Internals	
22			Yes
		ASME Class 1 Hangers and Supports	
23			Yes
		Non-ASME Class 1 Hangers and Supports	
24			Yes
		Snubbers	
25			No
	Reactor Coolant Pressure Boundary Components (Note the components of the RCPB are defined by each plant's CLB and site specific documentation)	ASME Class 1 Piping	
26			Yes

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure, component, or commodity grouping is active or passive

TYPICAL STRUCTURE COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10  
Revision 0  
March 1, 1996

ITEM	CATEGORY	STRUCTURE, COMPONENT, OR COMMODITY GROUPING	STRUCTURE COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
27	Reactor Coolant Pressure Boundary (cont'd)	Reactor Vessel	Yes
28		Reactor Coolant Pumps	Yes (Casing)
29		Control Rod Drives	No
30		Control Rod Drive Housing	Yes
31		Steam Generators	Yes
32		Pressurizers	Yes
33	Non-Class I Piping Components	Underground Piping	Yes
34		Piping in Low Temperature Demineralized Water Service	Yes
35		Piping in High Temperature Single Phase Service	Yes

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure component or commodity grouping is active or passive

TYPICAL STRUCTURE, COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10  
Revision 0  
March 1, 1996

ITEM	CATEGORY	STRUCTURE, COMPONENT, OR COMMODITY GROUPING	STRUCTURE, COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
36	Non-Class I Piping Components (cont'd)	Piping in Multiple Phase Service	Yes
37		Service Water Piping	Yes
38		Low Temperature Gas Transport Piping	Yes
39		Stainless Steel Tubing	Yes
40		Instrument Tubing	Yes
41		Expansion Joints	Yes
42		Ductwork	Yes
43		Sprinklers Heads	Yes
44		Miscellaneous Appurtenances (Includes fittings, couplings, reducers, elbows, thermowells, flanges, fasteners, welded attachments, etc	Yes

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure, component or commodity grouping is active or passive

TYPICAL STRUCTURE, COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10

Revision 0

March 1, 1996

ITEM	CATEGORY	STRUCTURE, COMPONENT, OR COMMODITY GROUPING	STRUCTURE, COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
45	Pumps	ECCS Pumps	Yes (Casing)
46		Service Water and Fire Pumps	Yes (Casing)
47		Lube Oil and Closed Cooling Water Pumps	Yes (Casing)
48		Condensate Pumps	Yes (Casing)
49		Borated Water Pumps	Yes (Casing)
50		Emergency Service Water Pumps	Yes (Casing)
51		Submersible Pumps	Yes (Casing)
52	Turbines	Turbine Pump Drives (excluding pumps)	Yes (Casing)
53		Gas Turbines	Yes (Casing)

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure, component, or commodity grouping is active or passive.

TYPICAL STRUCTURE COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10  
Revision 0  
March 1, 1996

ITEM	CATEGORY	STRUCTURE, COMPONENT, OR COMMODITY GROUPING	STRUCTURE, COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
54	Turbines (cont'd)	Controls (Actuator and Overspeed Trip)	No
55	Engines	Fire Pump Diesel Engines	No
56	Emergency Diesel Generators	Emergency Diesel Generators	No
57	Heat Exchangers	Condensers	Yes
58		HVAC Coolers	Yes
59		Primary Water System Heat Exchangers	Yes
60		Treated Water System Heat Exchangers	Yes
61		Closed Cooling Water System Heat Exchangers	Yes
62		Lubricating Oil System Heat Exchangers	Yes

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure, component, or commodity grouping is active or passive

TYPICAL STRUCTURE, COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10  
Revision 0  
March 1, 1996

ITEM	CATEGORY	STRUCTURE, COMPONENT, OR COMMODITY GROUPING	STRUCTURE, COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
63	Heat Exchangers (cont'd)	Raw Water System Heat Exchangers	Yes
64		Containment Atmospheric System Heat Exchangers	Yes
65	Motors	ECCS and Emergency Service Water Pump Motors	No
66		Small Motors	No
67	Miscellaneous Process Components	Gland Seal Blower	No
68		Recombiners	
69		Flexible Connectors	Yes
70		Strainers	Yes
71		Rupture Disks	Yes

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure, component, or commodity grouping is active or passive

TYPICAL STRUCTURE, COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10  
Revision 0  
March 1, 1996

ITEM	CATEGORY	STRUCTURE, COMPONENT, OR COMMODITY GROUPING	STRUCTURE, COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
72	Miscellaneous Process Components (cont'd)	Steam Traps	Yes
73		Restricting Orifices	Yes
74		Air Compressor	No
75	Instrumentation	Solenoid Operator	No
76		Differential Pressure Indicators	No
77		Differential Pressure Indicating Switches	No
78		Differential Pressure Switches	No
79		Differential Pressure Transmitters	No
80		Pressure Indicators	No

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure, component, or commodity grouping is active or passive

TYPICAL STRUCTURE, COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10  
Revision 0  
March 1, 1996

ITEM	CATEGORY	STRUCTURE, COMPONENT, OR COMMODITY GROUPING	STRUCTURE, COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
81	Instrumentation (cont'd)	Pressure Indicator Switches	No
82		Pressure Switches	No
83		Pressure Transmitters	No
84		Flow Switches	No
85		Flow Transmitters	No
86		Conductivity Elements	Yes (PB only)
87		Conductivity Switches	No
88		Flow Element	Yes (PB only)
89		Level Indicating Switches	No

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure, component, or commodity grouping is active or passive.

TYPICAL STRUCTURE, COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10  
Revision 0  
March 1, 1996

ITEM	CATEGORY	STRUCTURE, COMPONENT, OR COMMODITY GROUPING	STRUCTURE, COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
90	Instrumentation (cont'd)	Level Transmitters	No
91		Temperature Indicating Switches	No
92		Temperature Switches	No
93		Temperature Sensors	Yes (PB only)
94		Radiation Sensors	Yes (PB only)
95		Radiation Monitors	No
96		Radiation Transmitter	No
97		Gas Analyzer/Transmitter	No
98		Moisture Switch	No

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure, component, or commodity grouping is active or passive

TYPICAL STRUCTURE COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10

Revision 0

March 1, 1996

ITEM	CATEGORY	STRUCTURE COMPONENT OR COMMODITY GROUPING	STRUCTURE, COMPONENT OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
99	Instrumentation (cont'd)	Position Switch	No
100		Vibration Switch	No
101		Differential Pressure Indicating Controller	No
102		Flow Indicator	No
103		Flow Indicating Controller	No
104		Alarm Unit	No
105		Level Indicator	No
106		Level Switch	No
107		Temperature Controller	No

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure, component, or commodity grouping is active or passive

TYPICAL STRUCTURE COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10  
Revision 0  
March 1, 1996

ITEM	CATEGORY	STRUCTURE, COMPONENT, OR COMMODITY GROUPING	STRUCTURE, COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
108	Instrumentation (cont'd)	Power Supply	No
109		Converter-Voltage/Current	No
110		Converter-Voltage/Pneumatic	No
111		Controller	No
112		Isolator	No
113		Signal Conditioner	No
114		Recorder	No
115		Annunciators	No
116		Ammeters	No

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure, component, or commodity grouping is active or passive

TYPICAL STRUCTURE COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10

Revision 0

March 1, 1996

ITEM	CATEGORY	STRUCTURE, COMPONENT OR COMMODITY GROUPING	STRUCTURE COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
117	Instrumentation (cont'd)	Speed Indicators	No
118		Temperature Indicators	No
119		Speed Controllers	No
120		Watt Transducers	No
121		Thermocouple, RTD	Yes
122		Instrument Transformer	
123	Electrical Components	4.16 kV Switchgear Unit	No
124		480V Load Centers	No
125		480V Motor Control Centers	No

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure, component, or commodity grouping is active or passive.

TYPICAL STRUCTURE COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10  
Revision 0  
March 1, 1996

ITEM	CATEGORY	STRUCTURE COMPONENT OR COMMODITY GROUPING	STRUCTURE, COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
126	Electrical Components (cont'd)	250 VDC Motor Control Centers	No
127		Transistors	No
128		Circuit Breakers	No
129		Protective Relays	No
130		Control (Logic) Relays	No
131		Control Switches	No
132		Automatic Transfer Switches	No
133		Manual Transfer and Disconnect Switches	No
134		Batteries	No

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure component or commodity grouping is active or passive.

TYPICAL STRUCTURE COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10  
Revision 0  
March 1, 1996

ITEM	CATEGORY	STRUCTURE, COMPONENT, OR COMMODITY GROUPING	STRUCTURE, COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
135	Electrical Components (cont'd)	Battery Chargers, Inverters	No
136		Motor-Generator Sets	No
137		Distribution Panel Internal Component Assemblies (includes internal devices including switches, breakers, indicating lights, etc.)	No
138		Electrical Controls and Panel Internal Component Assemblies (includes internal devices including switches, breakers, indicating lights, etc.)	No
139		Heat Tracing	*
140		Electric Heaters	*
141		Connectors, electrical splices, terminal blocks	Yes
142		Power, Control, and Instrumentation Cables	Yes
143		Load Center Transformers	*

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure, component, or commodity grouping is active or passive

TYPICAL STRUCTURE COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10  
Revision 0  
March 1, 1995

ITEM	CATEGORY	STRUCTURE, COMPONENT, OR COMMODITY GROUPING	STRUCTURE, COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
144	Electrical Components (cont'd)	Small Distribution Transformers	.
145	Valves	Hydraulic Operated Valves	Yes (Bodies)
146		Explosive Valves	Yes (Bodies)
147		Manual Valves	Yes (Bodies)
148		Small Valves	Yes (Bodies)
149		Motor-Operated Valves	Yes (Bodies)
150		Air-Operated Valves	Yes (Bodies)
151		Main Steam Isolation Valves	Yes (Bodies)
152		Small Relief Valves	Yes (Bodies)

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure, component, or commodity grouping is active or passive.

TYPICAL STRUCTURE, COMPONENT AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-10  
Revision 0  
March 1, 1995

ITEM	CATEGORY	STRUCTURE, COMPONENT, OR COMMODITY GROUPING	STRUCTURE, COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
153	Valves (cont'd)	Check Valves	Yes (Bodies)
154		Safety Relief Valves	Yes (Bodies)
155		Dampers	No
156	Tanks	Air Accumulators	Yes
157		Discharge Accumulators (Dampers)	Yes
158		Boron Acid Storage Tanks	Yes
159		Above Ground Oil Tanks	Yes
160		Underground Oil Tanks	Yes
161		Demineralized Water Tanks	Yes

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure, component, or commodity grouping is active or passive.

TYPICAL STRUCTURE, COMPONENT, AND COMMODITY GROUPINGS  
AND ACTIVE/PASSIVE DETERMINATIONS FOR THE INTEGRATED PLANT ASSESSMENTS

NEI 95-1J

Rev. 7.0

March 1996

ITEM	CATEGORY	STRUCTURE, COMPONENT, OR COMMODITY GROUPING	STRUCTURE, COMPONENT, OR COMMODITY GROUPING IS PASSIVE? (YES/NO)
162	Tanks (cont'd)	Neutron Shield Tank	Yes
163	Fans	ventilation Fans	No
164		Other Fans	No
165	Miscellaneous	Emergency Lighting	No
166		Hose Stations	Yes

\* The applicant shall identify the intended function and apply the IPA process to determine if the structure, component, or commodity grouping is active or passive.

**NEI 95-10**  
**REVISION 0**  
**March 1, 1996**

## **APPENDIX C**

### **EXAMPLES TO DEMONSTRATE THE LICENSE RENEWAL PROCESS**

**APPENDIX C**  
**EXAMPLES TO DEMONSTRATE THE**  
**LICENSE RENEWAL PROCESS**

**Introduction**

This appendix presents examples to illustrate the implementation of the various steps delineated in NEI 95-10. These examples are not complete aging management reviews and are still under development. Inclusion in the guideline is not to be misconstrued, at this time, as NRC approval of the specific functions, aging effects, aging management programs or level of detail presented in each example.

In addition, when system functions are identified it should be recognized that there may be other system functions not listed that may result from a plant specific review. Similarly, examples 1 through 4 include an approach for managing a specific aging effect. Other relevant effects would require evaluation as well.

Also, example 5 is not intended to present an approach for managing the effects of aging. It is included in this appendix to reflect how an evaluation boundary might be determined on a complex assembly. It is understood that once the boundary is determined, the long-lived passive components would require an aging management review.

EXAMPLE 1  
PWR ONCE-THROUGH COOLING SYSTEM

*IDENTIFICATION OF INTENDED FUNCTION(S) (GUIDELINE SECTION 3.2)*

A once-through cooling system in a PWR consists of pumps, piping, control valves and heat exchangers necessary to transfer the plant heat loads to an ultimate heat sink. Figure C-1 is a simplified diagram of the system. It performs a number of important functions as listed below:

1. Transfer heat from the component cooling water heat exchanger to the ultimate heat sink during normal and accident conditions.
2. Transfer heat from the service water heat exchanger to the ultimate heat sink during normal and accident conditions.
3. Transfer heat from the ECCS pump room air cooler.
4. Provide seal water to the main circulating water pumps.

In comparing these four functions to the criteria listed in §54.4(a), it can be seen that functions 1, 2, and 3 would prevent the performance of safety related systems (component cooling, service water, and ECCS room cooler) if these functions were not performed. Therefore, functions 1, 2, and 3 are "intended functions" under the license renewal rule. Function 4 does not meet any of the criteria in §54.4(a) because it is not a safety-related function, it is not a function that would prevent the accomplishment of a safety-related function, and the components necessary to perform this function are not required to demonstrate compliance with the regulations referenced in §54.4(a)(3). Therefore this function is not an "intended function" as this term is used in the IPA.

Each train of the once-through cooling system is included in the scope of license renewal and the "passive, long-lived" components of each train of this system will be included in an aging management review.

*DOCUMENTING THE EVALUATION BOUNDARY AND DESCRIBING THE STRUCTURE OR COMPONENT'S INTENDED FUNCTION (GUIDELINE SECTION 4.1)*

The evaluation boundary includes all structures and components that are necessary for the system to perform its intended function. Once this boundary is established the components and structures that are long-lived and passive must be identified, along with their intended function. In accordance with the guideline, the component or structure intended function is the specified function of the structure or component that supports the system intended function. To conclude that the structure or component is passive, it must perform its intended function(s) without moving parts or a change in configuration or

properties. The results of passive structures and components and their associated intended functions include the following:

- The piping, valves, heat exchangers, pumps and instrument lines provide a pressure retaining boundary under all design loads (internal and external) so that sufficient flow at an adequate pressure is delivered from the pumps to the heat exchangers.
- The electrical panels provide structural support to the electrical components.
- The cables provide electrical separation between the conductors and insulation resistance.
- The component supports provide structural support for system piping, valves, heat exchangers, pumps, motors and instrumentation.

The evaluation boundary does not include the following structures and components for the reasons described below:

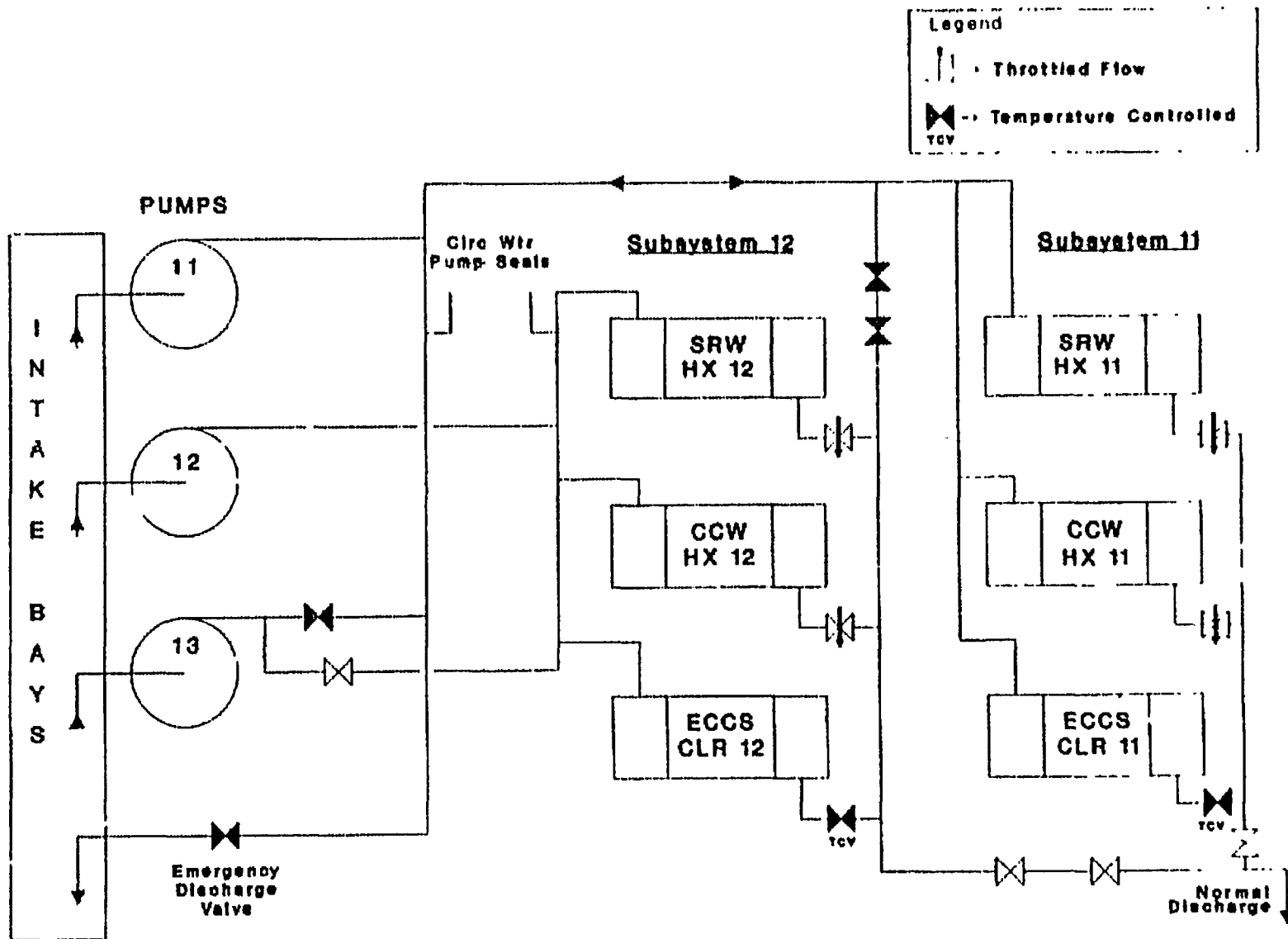
- System piping which delivers seal water to the main circulating water pumps because this piping does not perform an intended function described by §54.4.
- Supports for the seal water piping mentioned above because the supported pipe is not within scope and therefore the supports would also not be within scope.
- Cooling pump motors because these components exhibit motion and are therefore not passive (active). (*Note: motors are excluded, by the rule language in §54.21(a)(1)(i), from an aging management review for license renewal.*)

#### **DEMONSTRATING THE EFFECTS OF AGING ARE MANAGED** (GUIDELINE SECTION 4.2.1.3)

For the purpose of this example, only the piping is evaluated. The intended function of the piping is to provide a pressure boundary under all CLB conditions. The piping is carbon steel with an internal liner.

The aging effect is loss of material resulting from corrosion of the pipe. The aging effect is precluded from occurring by the pipe liner. However, because the liner is relied upon to preclude the aging effect, there is an inspection program in place to detect a loss of liner integrity. Any deficiencies discovered during the inspection program will be corrected in accordance with the applicant's corrective action program.

# PWR Once-Through Cooling System Simplified Diagram



EXAMPLE 2  
DIESEL GENERATOR FUEL OIL SYSTEM

*IDENTIFICATION OF INTENDED FUNCTION(S) (GUIDELINE SECTION 3.2)*

The diesel generator fuel oil system, for each of the four diesel generators, consists of an underground diesel fuel oil storage tank, a diesel oil transfer pump, a diesel oil day tank, engine and DC motor-driven fuel oil pumps, valves, piping, filters, strainers, a dirty fuel oil tank, and an auxiliary boiler day tank transfer pump. The functions of the diesel generator fuel oil systems are:

1. Provide sufficient fuel oil to the diesel engine to support one week of continuous operation at full load during a design basis event.
2. Provide the capability to transfer diesel fuel oil from the diesel storage tanks to the auxiliary boiler fuel oil system.

Function 1 is a safety-related function. It satisfies the first criterion of §54.4(a) and is therefore an "intended function." Function 2 does not meet any of the criteria in §54.4(a) and is not an "intended function."

*DOCUMENTING THE EVALUATION BOUNDARY AND DESCRIBING THE STRUCTURE OR COMPONENT'S INTENDED FUNCTION (GUIDELINE SECTION 4.1)*

The evaluation boundary includes all structures and components that are necessary for the system to perform its intended function. Once this boundary is established the components and structures that are long-lived and passive must be identified, along with their intended function. In accordance with the guideline, the component or structure intended function is the specified function of the structure or component that supports the system intended function. To conclude that the structure or component is passive, it must perform its intended function(s) without moving parts or a change in configuration or properties. The resulting passive component and associated intended functions include the following:

- The underground fuel oil storage tanks, the fuel oil transfer pumps (casing only), fuel oil day tanks, shaft and DC motor driven fuel oil pumps (casing only), valves, piping, and all instrumentation pressure boundary components provide a pressure boundary function
- The fuel oil strainer provides a pressure boundary function.

- The flexible hose connections at the diesel skid provides a pressure boundary function.
- The cables provide electrical separation between the conductors and insulation resistance.
- The cable trays, conduits, and component anchorages provide structural integrity.

*DEMONSTRATING THE EFFECTS OF AGING ARE MANAGED (GUIDELINE SECTION 4.2.1.3)*

*For the purpose of this example, only the underground storage tank is evaluated.*

The intended function of the underground storage tank is to provide a pressure boundary to ensure that the fuel oil necessary to operate the diesel generator is available under all CLB design conditions.

The tank is a horizontal cylindrical carbon steel tank mounted on below grade concrete pads. The external surface of the tank is covered with a bitumastic coating. The tank is also connected to the cathodic protection system.

The aging effect of concern for license renewal is loss of material on both the external and internal surfaces of the tank. The loss of material may result from corrosion of the internal surface and degradation of the external coating resulting in corrosion of the underlying material.

The aging management programs for the tank include prevention of water entering the tank, testing for water in the tank, and maintaining operation of the cathodic protection system. In addition the fuel oil is tested prior to being put into the tank to ensure it meets the standard outlined in NUREG 1.137 and ASTM D975.

The plant technical specifications require a monthly check for water in the bottom of the tank. Also, the fuel oil in the tank is tested monthly for water content by sampling oil that has been mixed using the transfer pump.

The fuel oil storage tank is drained, cleaned, and inspected every ten years as required by the plant technical specifications. The tank inspections consists of an internal visual inspection and ultrasonic test (UT) of wall thickness in 10 to 12 different locations.

The UT examinations look for loss of wall thickness on the internal and external surfaces of the tank.

The results of checks for water and internal inspections have shown very little, if any, water in the tank. The internal inspections show the tank is in good condition and free from any degradation. The UT examinations have not revealed any loss of wall thickness, indicating the bitumastic coating and the cathodic protection system are, and should continue to be effective.

Continuing these programs provides reasonable assurance that the intended function will be maintained during the period of extended operation.

### EXAMPLE 3 AUXILIARY FEEDWATER SYSTEM

#### *IDENTIFICATION OF INTENDED FUNCTION(S) (GUIDELINE SECTION 3.2)*

The auxiliary feedwater system consists of control and check valves, turbine driven and motor driven pumps, and piping. The system provides feedwater from the condensate storage tanks to the steam generators. There are three trains in this system. Its functions include:

1. Provide decay heat removal under post-accident conditions.
2. Supply feedwater during a 4 hour station blackout event to maintain and control water level in the steam generators.

A review of these functions against the criteria in §54.4(a) results in functions 1 and 2 as being "intended function." Function 1 is a safety-related function; function 2 meets the criteria relative to station blackout.

#### *DOCUMENTING THE EVALUATION BOUNDARY AND DESCRIBING THE STRUCTURE OR COMPONENT'S INTENDED FUNCTION (GUIDELINE SECTION 4.1)*

Each train of the auxiliary feedwater system is included in the scope of license renewal and the "passive, long-lived" components of each train of this system will be included in an aging management review.

The evaluation boundary includes all structures and components that are necessary for the system to perform its intended function. Once this boundary is established the components and structures that are long-lived and passive must be identified, along with their intended function. In accordance with the guideline, the component or structure intended function is the specified function of the structure or component that supports the system intended function. To conclude that the structure or component is passive, it must perform its intended function(s) without moving parts or a change in configuration or properties. The resulting passive components and associated intended functions include the following:

- The control valve body must maintain the pressure boundary to ensure the valve performs its function.
- The pump casings must maintain pressure boundary to ensure the pumps perform their function.

- The check valve body must maintain the pressure boundary to ensure the valve performs its function.
- System piping is included because it provides a pressure boundary .
- The component supports provide structural support for system piping, heat exchangers, pumps, valves, motors and instrumentation.
- The electrical panels provide structural support and electrical continuity of power to system pumps.

For purposes of this example, only the pump casing is evaluated. The intended function of the pump casing is to provide a pressure boundary under all CLB design conditions. The pump casing is carbon steel.

*DEMONSTRATING THE EFFECTS OF AGING ARE MANAGED  
(GUIDELINE SECTION 4.2.1.3)*

The aging effect of concern for license renewal is loss of material due to galvanic corrosion, general corrosion, erosion, erosion/corrosion, and microbiological induced corrosion (MIC).

The pump casing is susceptible to general corrosion over a long period of time. Industry operating experience shows that rates of .025 mm per year or greater are possible for carbon steel, and localized pitting corrosion are significantly greater. However, this pump casing has a design corrosion allowance of 3.2 mm or greater which should be sufficient for 60 years.

Galvanic corrosion between dissimilar metals is of concern for this pump because it is in a treated water system. Also, treated water can contain microbes at system temperatures below 100°C leading to MIC in locations where wetted pump components are exposed to low fluid velocity.

The pump erosion program examines the pump casing for erosion caused by cavitation due to fouling. Pump erosion control program requirements include:

- Volumetric examination of the pump casing from the outside surface of the pump. The examination technique must be capable of measuring loss of material with an accuracy of  $\pm 5\%$  of nominal wall thickness.
- The pump being examined is re-examined at an interval not exceeding ten years from the initial examination date provided the predicted erosion rate will not reach 70% of

nominal wall thickness or minimum wall thickness, whichever is greater within that time-frame prior to the re-examination date.

- Trending of quarterly surveillance test data (differential pressure, rotational speed, vibration, and flow rate) and periodic preventive maintenance activities are performed as an early indicator of degraded condition of the pump internals.
- Whenever the pump, or a similar pump having identical configuration and process variables, is disassembled for maintenance, a visual examination (VT-3) is performed on the internal surfaces of the pump.

Lastly, the pump is examined in accordance with ASME Section XI In-Service Inspection requirements and the plant's wall thinning management program.

Maintaining these programs will provide reasonable assurance that the intended function will be maintained during the period of extended operation.

EXAMPLE 4  
POWER CIRCUIT FOR A REACTOR BUILDING COOLING FAN MOTOR

*This example examines only the electrical components in the power circuit and not the mechanical or civil components supporting the power path. This example is typical of many power circuits in the plant.*

*IDENTIFICATION OF INTENDED FUNCTION(S) (GUIDELINE SECTION 3.2)*

The reactor building cooling fan motor 1A (RBCF-1A), is part of the Reactor Building (RB) Cooling System. The intended functions of the system are:

1. Provide heat removal from the containment atmosphere during post accident conditions to assist in RB pressure and temperature control,
2. Provide post-accident mixing of RB atmosphere, and
3. Maintain RB atmosphere within the environmental envelope to assure component operability

The reactor building cooling fan motor is located in containment, runs continuously during normal and shutdown operations and is designated as 1E. The electrical component that make-up the RBCF-1A power circuit are:

1. fan motor,
2. cable(A),
3. penetration ,
4. cable(B),
5. motor control center (MCC) (breaker/bus),
6. cable(C),
7. load center transformer
8. cable(D), and
9. switchgear (breaker/bus).

Cable (A) is in the Reactor Building, cables (B), (C) and part of (D) are in the Auxiliary Building, and part of cable (D) is in the Turbine Building

*DOCUMENTING THE EVALUATION BOUNDARY AND DESCRIBING THE STRUCTURE OR COMPONENT'S INTENDED FUNCTION (GUIDELINE SECTION 4.1)*

The fan motor, MCC and switchgear are active components and thus are not subject to an aging management review. The cables and penetration are passive components, and are

not replaced based on qualified life or specified time period. These components are subject to an aging management review. *(Note: The system includes a load center transformer which is identified in Appendix B of this guideline as an item that must be evaluated (for the passive/active determination) on a plant-specific basis. Therefore it is not evaluated as part of this example.)*

The entire RBCF-1A power circuit is within the scope of the License Renewal Rule.

The cable intended functions are to provide electrical separation between the conductors and insulation resistance.

The penetration intended functions are to provide containment integrity, electrical separation between the conductors and insulation resistance.

#### **DEMONSTRATING THE EFFECTS OF AGING ARE MANAGED (GUIDELINE SECTION 4.2.1.3)**

(This example considers only the temperature as a mechanism leading to aging effects. Relevant effects from other mechanisms would also be evaluated.)

#### **CABLES**

Cables (A), (B), (C) and (D) are rated by the manufacturer for 40 years at 90°C (the cable insulation would maintain its function for a minimum of 40 years while being exposed to 90°C conductor temperature).

Cable (A) is in the Reactor Building, is included in the EQ Program and is qualified for 40 years based on analysis and testing. This original analysis was based on conservative, calculated temperature assumptions. Based on actual temperature measurements, this cable was reanalyzed and found to have a qualified life in excess of 60 years. In addition to the reanalysis, a cable monitoring program is in place to verify that the intended function of the cable insulation is maintained. Based on the actual thermal environment the cables are exposed to and the cable monitoring program, the aging of this cable will be adequately managed.

Cables (B), (C) and part of (D) are in the Auxiliary Building which is a well controlled environment. The temperature these cables are exposed to are well below any reasonable threshold to ensure ample thermal insulation life during and beyond the period of extended operation. No further aging management is required.

Part of cable (D) is in the Turbine Building. Thermography surveys were performed that indicate this cable could be exposed to temperatures as high as 60°C on a summer day. Ohmic heating due to the continuous power load causes a 15°C rise in temperature on the

cable conductors. Therefore, the maximum temperature the insulation is exposed to is  $75^{\circ}\text{C}$  ( $60^{\circ}\text{C}-15^{\circ}\text{C}$ ). Based on the industry rule-of-thumb that for every  $10^{\circ}$  reduction in temperature the cable insulation life is doubled, and the fact that the cable is exposed to this maximum temperature for short periods during summer days, this cable insulation is expected to maintain its intended function at least 60 years.

## PENETRATION

The penetration is included in the EQ Program and has been qualified for 40 years with the ability to withstand a post accident environment at the end of that period. This 40 year qualified life is based on thermal accelerated aging using conservative service temperature assumptions. Based on actual temperature measurements, this penetration was reanalyzed and found to have a qualified life exceeding 60 years. In addition to the reanalysis, a one time inspection will be performed on this penetration. This inspection will be performed at least 5 years before the end of the existing qualified life.

The inspection will be focused on the connections and O-ring materials in the penetration assembly. The results of the inspection will be evaluated against applicable acceptance criteria and a judgment made relative to the component end of life. Based on the expected end of life, the penetration will either be refurbished, as needed or replaced.

Based on the actual thermal environment the penetrations are exposed to and the planned inspection, the aging of this penetration will be adequately managed.

EXAMPLE 5  
COMPLEX ASSEMBLY  
CONTROL ROOM CHILLERS

*The purpose of this example is to show how a complex assembly (Reference Section 4 I.1) evaluation boundary might be determined. It is understood that once the boundary is determined, the long-lived passive components would require an aging management review.*

The control room chillers were purchased as skid mounted equipment. These chillers are part of the control room chilled water system. There are two (2) control room chillers. Each is a 100% capacity refrigeration unit.

The functions of the control room chillers are:

1. to provide a reliable source of chilled water at a maximum temperature of 44°F,
2. to provide a pressure boundary for the control room chilled water system,
3. to provide a pressure boundary for the service water system,
4. to provide a pressure boundary for the refrigerant.

All of these functions are considered intended functions.

Typically, control room chillers are considered as one functional unit; however, for purposes of evaluating the effects of aging, it is necessary to consider the individual components. Therefore, the boundary of each control room chiller is established as follows:

1. At the inlet and outlet flanges of the service water system connections on the control room chiller condenser. Connected piping is part of the service water system.
2. At the inlet and outlet flanges of the control room chilled water system piping connections on the control room chiller evaporator. Connected piping is part of the control room chilled water system.
3. For electrical power supplies, the boundary is the output terminals on the circuit breakers supplying power to the skid. This includes the cables from the circuit breaker to the skid and applies for 480 VAC and 120 VAC.

4. The interface for instrument air supplies is at the instrument air tubing connection to the pressure control regulators, temperature controllers and transmitters, and solenoid valves located on the skid. The tubing from the instrument air header to the device on the skid is part of the instrument air system.
5. The interface with the annunciator system is at the external connection of the contacts of the device on the skid (limit switch, pressure switch, level switch, etc.) that indicates the alarm condition. The cables are part of the annunciator system.

Based on the boundary established, the following components would be subject to an aging management review:

1. condenser
2. evaporator
3. economizer
4. chiller refrigerant piping
5. refrigerant expansion orifice
6. foundations and bolting
7. electrical cabinets
8. cables, conduit, trays and supports
9. valves



NUCLEAR  
ENERGY  
INSTITUTE