Proposed Standard
License Renewal Application
Format Package

January, 2003

Executive Summary

After receipt of the Calvert Cliffs and Oconee renewed Operating Licenses, both the NRC and the industry felt that the efficiency of the License Renewal Application (LRA) review process could be significantly improved. In early 2001, they began working together to develop a standard way of presenting the results of the aging management reviews in the LRA Section 3 tables; and the "Plant X and Plant Y" project was born.

Improvements in efficiency were realized through this effort. However, the industry and NRC felt that more still needed to be done in this area. NRC reviewers were experiencing some difficulty obtaining the required information in a format that could make their review most efficient. Numerous Requests for Additional Information (RAIs) were being issued for information that was already contained within the LRA, but which the reviewers were having difficulty locating. In addition, some information that the reviewers needed was not contained within the LRA. As each successive applicant attempted to address these needs, the presentation and content of data changed from application to application. This resulted in inefficiency and confusion for the reviewers and for the subsequent licensees who were developing applications.

In July of 2002, a group of utility members formed a Standard License Renewal Application project team, under the coordination of the Nuclear Energy Institute (NEI). The team met periodically with NRC staff throughout the remainder of 2002. Building upon the lessons learned from the "Plant X and Plant Y" effort, they developed a new set of Section 3 tables, which they believe contain the right amount of information, presented in the best way possible, in order to gain the maximum efficiency from the data presentation.

Since the various sections of the LRA work together to present the necessary information, it would not have been enough to only develop standard Section 3 tables. Therefore, the project team also standardized as much of the rest of the application as was necessary to gain the maximum efficiency for future NRC reviews. The result is a proposed Standard License Renewal Application (SLRA) with examples of Section 2, Section 3, and Appendix B included. A "generic" Pressurized Water Reactor was used for all examples. This should not present a problem for Boiling Water Reactor applicants, since the purpose of the examples is to illustrate format and what type of information should be included in the LRA, not technical content.

The industry expects that all future applicants will use this guidance (as revised or incorporated into other industry documents) to develop their License Renewal Applications. The industry strongly urges NRC staff reviewers to honor this format and refrain from making special requests for format deviations.

Package Contents

This package contains the following items:

1. Section 2 of the SLRA
   - Section 2 description
   - Section 2 example

2. Section 3 of the SLRA
   - Section 3 description
   - Section 3 example

3. Appendix B of the SLRA
   - Appendix B description
   - Appendix B example

4. Recommendations To Applicants For Enhancing NRC License Renewal Application (LRA) Review Efficiency

Standard License Renewal Application (SLRA)

Section 2.0

Section 2.0 Description

Introduction

The License Renewal Application (LRA) standardization project focused on those areas of the LRA where the industry and NRC felt that review efficiency could be significantly improved by standardizing the format. Section 2 was one of those areas. However, not all subsections within Section 2 needed attention. Where experience had demonstrated that this type of information is well known, no information was included in Section 2 of the proposed Standard License Renewal Application (SLRA). For all other subsections of Section 2, sample information has been provided and presented in the proposed format. The information contained within the SLRA is for illustrative purposes only. It is included to help the applicant and reviewer understand the proposed subsection format and the type of information that is recommended for inclusion in a plant specific LRA. While the information may be technically valid for one plant, it may not be technically valid for another.

Format

Section 2 of the SLRA consists of the following four subsections:

2.0 Scoping and Screening Methodology for Identifying Structures and Components Subject to Aging Management Review and Implementation Results

2.1 Scoping and Screening Methodology

2.2 Plant Level Scoping Results

2.3 Scoping and Screening Results

2.0 Scoping and Screening Methodology for Identifying Structures and Components Subject to Aging Management Review and Implementation Results

This subsection provides a brief introduction to Section 2.0. In addition, it contains Table 2.0-1, "Intended Functions Abbreviations & Definitions," which contains the meanings for the abbreviations used in the Screening and AMR results tables to represent the intended functions for components, subcomponents and structural members.

2.1 Scoping and Screening Methodology

Experience has demonstrated that the expected format and content of this subsection are well understood by licensees and reviewers. Therefore, the SLRA contains no data for this section, with the exception of section 2.1.X.

During the SLRA development effort, the NRC informed the industry that their LRA review would be more efficient if the applicant would state their position regarding the subject of any Interim Staff Guidance (ISG) documents under development at the time of application submittal. Subsection 2.1.X has been included to reflect this recommendation. The numbering scheme of "2.1.X" indicates that this information should be contained somewhere within subsection 2.1, but exactly where in section 2.1 is at the discretion of the applicant.

2.2 Plant Level Scoping Results

Experience has demonstrated that the expected format and content of this subsection are well understood by licensees and reviewers. Therefore, the SLRA contains no data for this section.

2.3 Scoping and Screening Results

This section contains the scoping and screening results of the sample plant Containment Spray System, presented in the proposed format. This subsection starts with number 2.3.2 because an Engineered Safety Features System subsystem was used (Containment Spray System) for the example. A Reactor Coolant System subsystem would be designated 2.3.1.

This section contains the following information for the sample plant Containment Spray System:

- System Description
- FSAR References
- License Renewal Drawings
- Components Subject to AMR

System Description

This section contains the Containment Spray System description. It incorporates NRC staff recommendations to include sufficient detail for the staff to use it in the associated section of the Safety Evaluation Report (SER). It includes a discussion of the system intended function (i.e., why the system is in scope for License Renewal), including which criteria of 10 CFR 54 require the system to be in scope. The portions of this system containing components subject to an AMR are also identified.

FSAR References

For the sample plant, only one section of the Final Safety Analysis Report (FSAR) is relevant to the scoping and screening for the Containment Spray System. However, if more sections of the FSAR were used, they would have been identified here. This section is hyperlinked to the appropriate FSAR section.

License Renewal Drawings

The license renewal drawings for the Containment Spray System are listed in this subsection. Each drawing number is hyperlinked to its associated drawing. Note that in the SLRA only the first two drawings have active hyperlinks.

Components Subject to AMR

The reviewer is referenced (with hyperlink) to Table 2.3.2-1 for a list of the component types that require Aging Management Review (AMR). In addition the reviewer is referenced to Table 3.2.2-1 (with hyperlink) for the results of the AMR of the Containment Spray System components.

2.3.2.X Plant Specific System

This section contains only formatting information. It is intended to illustrate where the next system within the Engineered Safety Features subsection would be located in a license renewal application.

Section 2.0 Example

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

This section provides the scoping and screening results for those component types that will be subject to aging management review in Section 3.0.

Definitions and abbreviations of the intended functions which were used in the scoping and screening and aging management reviews are included in Table 2.0-1, Intended Functions: Abbreviations & Definitions.

INTENDED FUNCTIONS ABBREVIATIONS AND DEFINITIONS

This section contains the meanings for the abbreviations used in the Screening and AMR results tables to represent the intended functions for components, subcomponents, and structural members.

Table 2.0-1: Intended Functions Abbreviations & Definitions

Intended Function	Abbreviation	Definition
Conducts Electricity	CE	Conducts electricity.
Enclosure Protection	EN	Provides enclosure, shelter, or protection for in-scope equipment (including radiation shielding, ~~and~~ pipe whip restraint). & and thermal shielding
EQ Barrier	EQB	Provides an environmental qualification (EQ) barrier.
Fire Barrier	FB	Provides a rated fire barrier to confine or retard a fire from spreading to or from adjacent areas of the plant.
Flood Barrier	FLB	Provides a protective barrier for internal/external flood events.
Flow Control	FC	Provides flow control.
Flow Distribution	FD	Provides for flow distribution.
Filtration	FLT	Provides filtration.
Flow Restriction	FR	Limits mass flow rate (water or steam), For example an orifice
Vortex Suppression	VS	Suppressing or breaking the water vortex near pump suction to prevent cavitation.

Table 2.0-1: Intended Functions Abbreviations & Definitions

Intended Function	Abbreviation	Definition
Heat Sink	HS	Provides a heat sink during SBO or design basis accidents.
Heat Transfer	HT	Provides for heat transfer.
Jet Impingement Shield	JIS	Provides jet impingement shielding for high energy line breaks.
Missile Barrier	MB	Provides a missile (internal or external) barrier.
Pressure Boundary	PB	Provides a pressure boundary.
Source of Cooling Water	SCW	Provides a source of cooling water for plant shutdown.
Structural Support [Criteria a(2) & a(3) requirement]	SNS	Provides structural and/or functional support to equipment meeting license renewal Criterion 2 (non-safety affecting safety-related) and/or Criterion 3 (the five regulated events).
Spray Pattern	SP	Provides a spray pattern.
Structural Support [Criterion a(1) equipment]	SSR	Provides structural and/or functional support for safety-related equipment.

2.1 SCOPING AND SCREENING METHODOLOGY

2.1.X INTERIM STAFF GUIDANCE DISCUSSION

The NRC staff has identified three issues for which additional staff and industry guidance clarification is necessary. They are:

1. Housing of Active Components
2. Interpretation of 10 CFR 54(a)(2) ← 54.4(a)(2)
3. Treatment of Electrical Fuse Holders

The following is a discussion of the general process used during the License Renewal Integrated Plant Assessment for each of these areas:

Housing of Active Components

The Statements of Consideration for 10 CFR 54 provides the License Renewal Rule philosophy that, during the extended period of operation, safety-related functions should be maintained in the same manner and to the same extent as during the current licensing term. Examples of structures and components that perform passive functions are listed in 10 CFR 54.21(a)(1)(ii), which states, "These structures and components include, but are not limited to, pump casings, valve bodies . . ."

Pumps and valves were just an example meant to focus the AMR process on the passive function of an SSC. That passive function is not limited to the pressure boundary of the reactor coolant system. The exclusion of an SSC due to its active nature only applies to that portion of the SSC with an active function and not to those portions of the SSC with a passive function. Therefore, an SSC such as a vent duct, which is both long-lived and passive, and houses a fire protection damper, is considered to be within the scope of license renewal and subject to aging management review.

Interpretation of ~~10 CFR 54(a)(2)~~ 10 CFR 54.4(a)(2)

10 CFR 54.4(a)(2) states that SSCs within the scope of license renewal shall include non-safety related SSCs whose failure could prevent the satisfactory accomplishment of any of the functions identified for safety related SSCs, in 10CFR54.4(a)(1)(i)(ii) or (iii).

The process that was used to identify the in-scope non-safety related SSCs under 10 CFR 54.4(a)(2) was divided into two phases; an analytical phase and a physical phase. For the analytical phase, the FSAR, Technical Specifications, design documents, design drawings and the SSC safety classifications were reviewed to identify the in-scope non-safety related SSCs. However, this type of review alone could not provide the necessary information relative to system spatial interactions. Therefore, phase two utilized a plant spaces physical review, which evaluated SSCs for possible interactions that were not explicitly described in the CLB.

This two phased approach resulted in non-safety related SSCs being identified as in-scope when there was a potential for interaction either physically or spatially with the intended function of safety related SSCs.

Treatment of Electrical Fuse Holders

Consistent with the requirements specified in 10 CFR 54.4(a), fuse holders (including fuse clips and fuse blocks) are considered to be passive electrical components. Fuse holders are scoped, screened, and included in the aging management review (AMR) in

the same manner as terminal blocks and other types of electrical connections. However, fuse holders inside the enclosure of an active component, such as switchgear, power supplies, power inverters, battery chargers, and circuit boards, are considered to be piece parts of the larger assembly. Since piece parts and sub-components in such an enclosure are inspected regularly and maintained as part of the normal maintenance and surveillance activities, they are considered not subject to an AMR. Fuse holders perform a primary function similar to electrical connections by providing an electrical circuit to deliver rated voltage, current, or signals. These intended functions of fuses meet the criteria of 10 CFR 54.4(a). Additionally, these intended functions are performed without moving parts or without a change in configuration or properties as described in 10 CFR 54.21(a)(1)(i). Fuse holders are ~~therefore~~ passive, long-lived electrical components within the scope of license renewal and are subject to an AMR. Aging management of the clips is required for those cases where fuse holders are not considered piece parts of a larger assembly.

Fuse holders are not replaced based on qualified life or specified time period, therefore

2.2 PLANT LEVEL SCOPING RESULTS

2.3 SCOPING AND SCREENING RESULTS: MECHANICAL SYSTEMS

2.3.2 ENGINEERED SAFETY FEATURES SYSTEMS

2.3.2.1 CONTAINMENT SPRAY (CS) SYSTEM

System Description

The purpose of the Containment Spray (CS) system is to limit the containment pressure and temperature after a Loss-of-Coolant Accident (LOCA) or Main Steam Line Break (MSLB) accident and thus reduce the possibility of leakage of airborne radioactivity to the outside environment. The CS system, in conjunction with the containment air recirculation and cooling system, provides sufficient heat removal capability to limit the post-accident containment pressure and structural temperature below the design values of 54 psig and 289°F, respectively.

The CS system initially draws borated treated water from the Refueling Water Storage Tank (RWST). The treated water flows through the CS pumps, shutdown cooling heat exchangers and interconnecting piping to the spray nozzles. When the RWST reaches a preset low level, the CS system draws off the containment sump through the CS pumps, shutdown cooling heat exchangers, and interconnecting piping to the spray nozzles. The CS nozzles direct sprays of cooled borated water downward from the upper regions of the containment to cool and depressurize the containment building.

The CS system meets 10 CFR 54.4 (a)(1) because it is a safety related system that is relied upon to remain functional during and following design-basis events, to prevent or

mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in 10 CFR 50.67 (b)(2) and 10 CFR 100.11. It also meets 10 CFR 54.4(a)(3) because the components within the system are relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49). The components subject to an AMR extend from the RWST and the Containment Sump system to the spray nozzles located inside containment.

FSAR References

Additional details of the CS system can be found in the FSAR, Section 6 4.

License Renewal Drawings

The license renewal drawings for the CS system are listed below:

25203-LR26015, Sh.1
25203-LR26015, Sh.2
25203-LR26015, Sh.3

Components Subject to AMR

The component types that require aging management review are indicated in Table Table 2.3.2-1, Containment Spray System.

The aging management review results for these components are provided in Table 3.2.2-1:, Engineered Safety Features - Containment Spray System - Summary of Aging Management Evaluation.

2.3.2.X PLANT SPECIFIC SYSTEM

System Description

FSAR References

Additional details of the **** System**** can be found in the FSAR, Section ****.

License Renewal Drawings

The license renewal drawings for the **** System **** are listed below:

Components Subject to AMR

The component types that require aging management review are indicated in Table 2.3 2-X, Plant Specific System.

Section 2 Tables: Engineered Safety Features

See Table 2.0-1 for definition of intended function.

Table 2.3.2-1 Containment Spray System

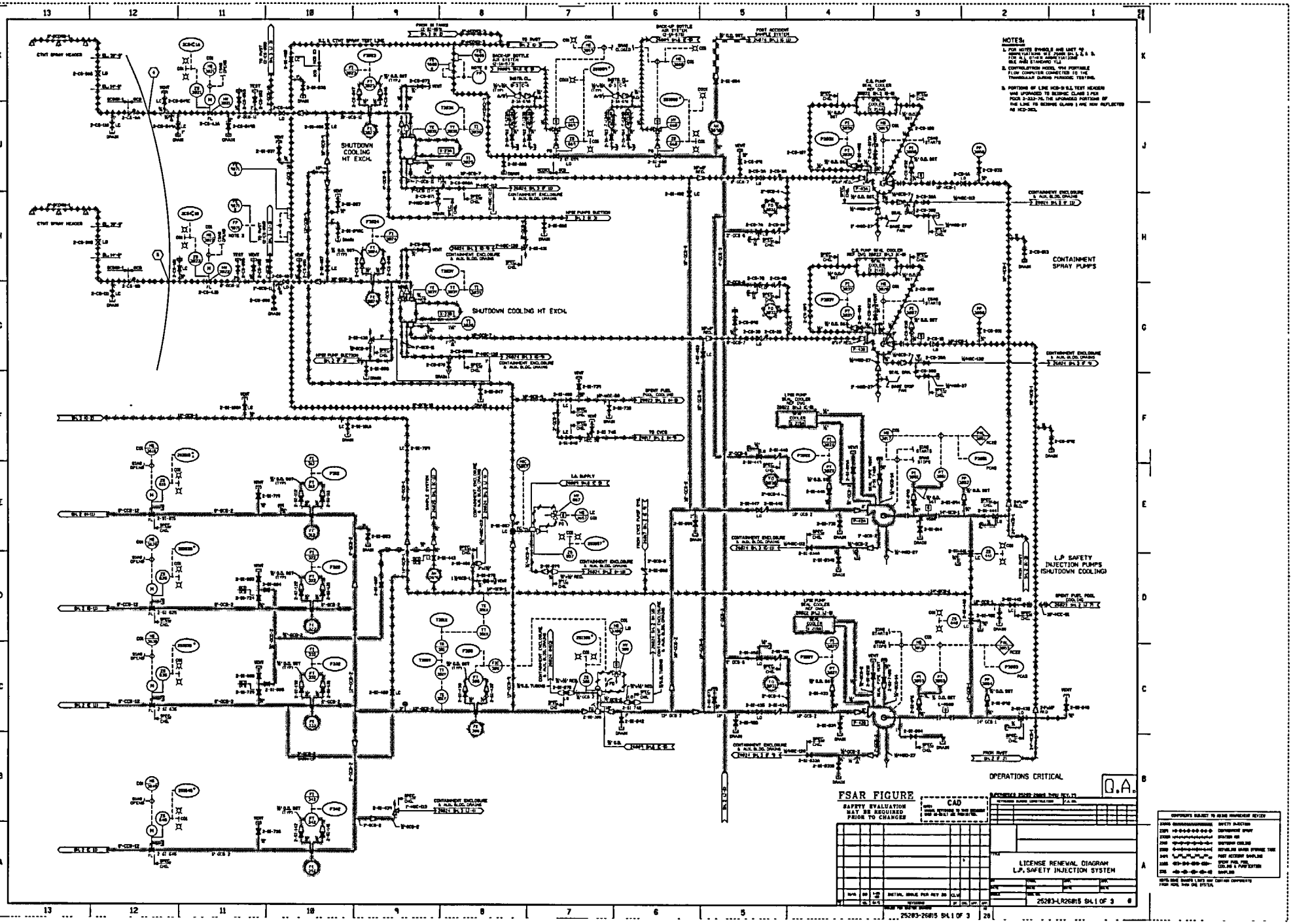
Component Type	Intended Function(s)
Heat exchangers (shell)	Pressure boundary
Heat exchangers (tubes)	Heat transfer, Pressure boundary
Piping	Pressure boundary
Pump casing	Pressure boundary
Spray Nozzles	Flow control, Pressure boundary

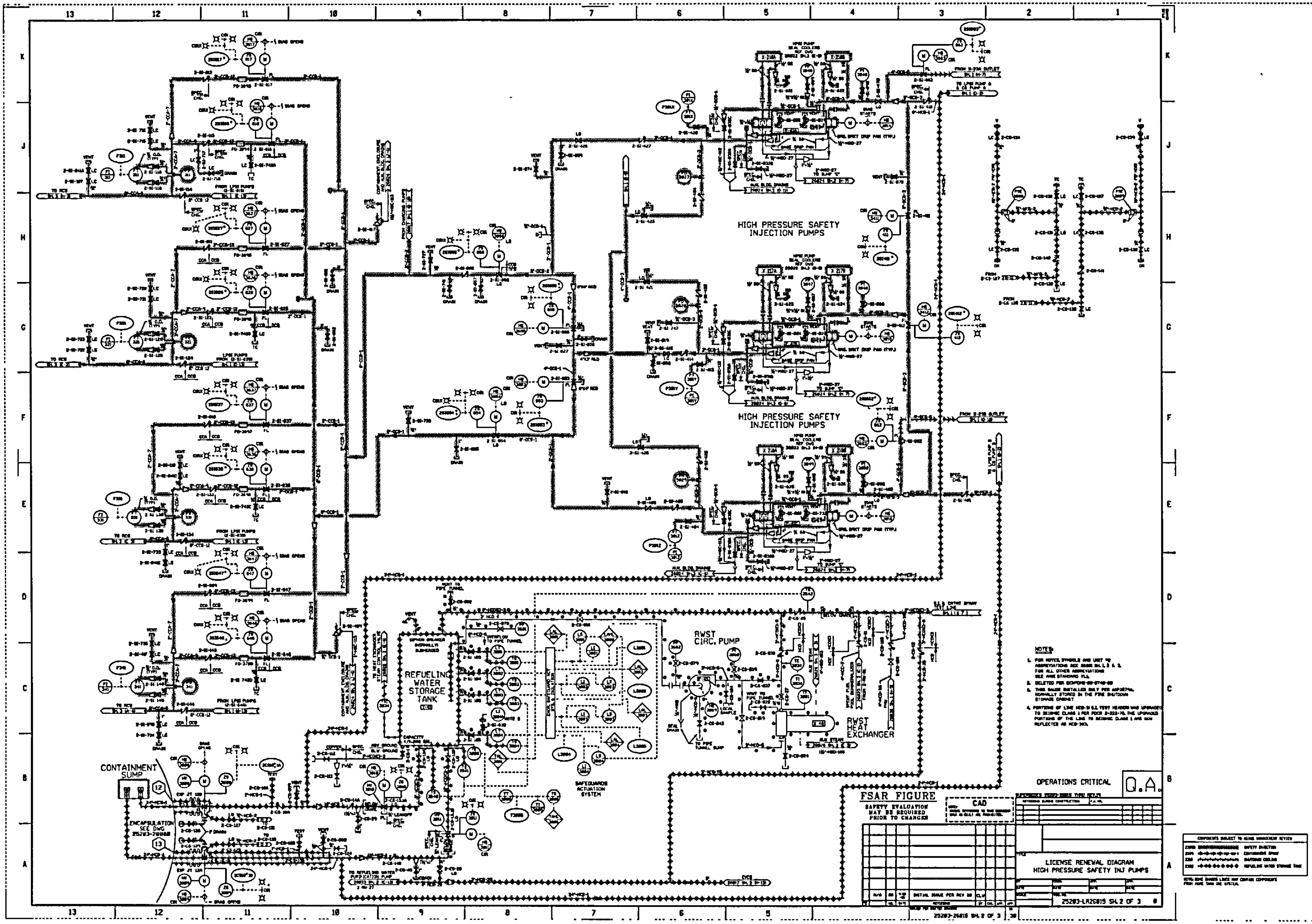
See Table 2.0-1 for definition of intended function.

Table 2.3.2-X Plant Specific System

Component Type	Intended Function(s)

See Table 2.0-1 for definition of intended function.


NOTES:
SHUTDOWN COOLING HT EXCH
CONTAINMENT SPRAY PUMPS
L.P. SAFETY INJECTION PUMPS (SHUTDOWN COOLING)
OPERATIONS CRITICAL
Q.A.
FSAR FIGURE
SAFETY EVALUATION MAY BE REQUIRED PRIOR TO CHANGES
CAD
LICENSE RENEWAL DIAGRAM
L.P. SAFETY INJECTION SYSTEM
25203-26815 SH.1 OF 3


HIGH PRESSURE SAFETY INJECTION PUMPS
HIGH PRESSURE SAFETY INJECTION PUMPS
REFUELING WATER STORAGE TANK
RWST CIRC. PUMP
RWST HEAT EXCHANGER
CONTAINMENT SUMP
SAFEGUARDS ACTUATION SYSTEM
NOTES:
OPERATIONS CRITICAL
Q.A.
FSAR FIGURE
SAFETY EVALUATION MAY BE REQUIRED PRIOR TO CHANGES
CAD
LICENSE RENEWAL DIAGRAM HIGH PRESSURE SAFETY INJ PUMPS

Standard License Renewal Application (SLRA)

Section 3.0

Section 3.0 Description

Introduction

Section 3 is the area of License Renewal Application (LRA) that the industry and NRC felt needed the most standardization. Experience had shown that NRC reviewers were having difficulty obtaining the required information in a format conducive to an efficient review. Numerous Requests for Additional Information (RAIs) were being issued for information that was already in the LRA, but was not able to be located by the reviewer. In addition, some information that the reviewers needed was not in the LRA at all. As each successive applicant attempted to address these needs, the format and content changed from application to application. This resulted in inefficiency and confusion for the reviewers and for the subsequent licensees who were developing applications.

The LRA standardization effort focused on addressing these issues. The result is a proposed Section 3 that includes "Boiler Plate" information in subsection 3.0 and a detailed example of a single subsection (Aging Management of Engineered Safety Features Systems) in subsection 3.2. It is expected that applicants will use the example subsection as a model for the remaining subsections of Section 3. The information contained within the Standard License Renewal Application (SLRA) is for illustrative purposes only. It is included to help the applicant and reviewer understand the proposed subsection format and the type of information that is recommended for inclusion in a plant specific LRA. While the data may be technically valid for one plant, it may not be technically valid for another.

Format

Section 3 of the SLRA consists of the following two major subsections:

3.0 Aging Management Review Results
3.2 Aging Management of Engineered Safety Features Systems

The SLRA uses an Engineered Safety Features system (Containment Spray System) for its example. The SLRA project team felt that this would be the best example to use for the standardized LRA considering several factors, including availability of real plant data at the time of SLRA development. Therefore, the subsection numbering jumps from subsection 3.0 to 3.2, skipping subsection 3.1, which would be the Reactor Coolant System subsection. In fact, a licensee's LRA that is based on the SLRA is expected to actually contain six major subsections: 3.0 Aging Management Review Results, 3.1 Aging Management of Reactor Vessel, Internals, and Reactor Coolant System, 3.2 Aging Management of Engineered Safety Features, 3.3 Aging Management of Auxiliary Systems, 3.4 Aging Management of Steam and Power Conversion System, 3.5 Aging Management of Containment Structures and Component Supports, and 3.6 Aging Management of Electrical and Instrumentation and Controls.

3.0 Aging Management Review (AMR) Results

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

- Table Description
- Table Usage

Table Description

The purpose of Section 3 of the LRA is to present the results of the Aging Management Reviews. The Table Description section of the SLRA describes the two tables that have been developed to present the AMR results information. It describes each column and defines the type of information that each column should contain, including level of detail, where appropriate.

Table Usage

This section describes how the two tables work together to present all of the needed information to the reviewer.

3.2 Aging Management of Engineered Safety Features Systems

As was noted earlier, the SLRA uses an Engineered Safety Features system (Containment Spray System) for its example. It is expected that applicants will use this example as a model for the remaining subsections of Section 3.

Subsection 3.2 is further divided into the following subsections:

3.2.1 Introduction
3.2.2 Results
3.2.3 Conclusion
3.2.4 References

3.2.1 Introduction

This subsection provides the roadmap for the remainder of subsection 3.2. It lists the section of the SLRA where the Engineered Safety Features System SSCs are identified (including a hyperlink). It also lists the systems, or portions of systems, that are addressed in this subsection. Finally, it contains Table 3.2.1, which presents the sample plant Engineered Safety Features subsystem information, correlated to the data from NUREG-1801, Volume 1, "Table 2 Summary of Aging Management Programs for the

Engineered Safety Features Evaluated in Chapter V of the GALL Report."

3.2.2 Results

This subsection contains Table 3.2.2-1, which summarizes the results of the aging management reviews for the Containment Spray System. It also identifies where the same information would be located for the next system within the Engineered Safety Features System subsection (identified as "Plant Specific System"). There is no actual data contained within this subsection for the Plant Specific System. The Plant Specific System example is included for illustrative purposes only, so that the reader can determine how this subsection is to be constructed.

Subsection 3.2.2 also contains a summary of the materials, environments, aging effects requiring management and aging management programs for each subsystem within the Engineered Safety Features System.

Finally, it includes all of the "Further Evaluation Recommended" information associated with the Engineered Safety Features System. NUREG-1801 Volume 2 and the tables of the Standard Review Plan for License Renewal (NUREG-1800), indicate which attributes of the program need to be evaluated by the reviewer. This section provides the plant-specific information required for this evaluation.

3.2.3 Conclusion

This subsection contains a conclusion statement regarding the ability of the selected Aging Management Programs (AMPs) to manage the effects of aging on the SSCs that are subject to aging management review for the Engineered Safety Features System.

3.2.4 References

A list of references associated with Section 3.2 of the LRA is provided in this section.

Section 3.0 Example

3.0 AGING MANAGEMENT REVIEW RESULTS

This section provides the results of the aging management review for those structures and components identified in Section 2.0 as being subject to aging management review.

Descriptions of the internal and external service environments which were used in the aging management review to determine aging effects requiring management are included in Table 3.0-1, Internal Service Environments and Table 3.0-2, External Service Environments. The environments used in the aging management reviews are listed in the Environment column.

Most of the Aging Management Review (AMR) results information in Section 3 is presented in the following two tables:

- **Table 3.x.1** - where '**3**' indicates the LRA section number, '**x**' indicates the subsection number from NUREG 1801, Volume 1, and '**1**' indicates that this is the first table type in Section 3. For example, in the Reactor Coolant System subsection, this table would be number 3.1.1, in the Engineered Safety Features subsection, this table would be 3.2.1, and so on. For ease of discussion, this table will hereafter be referred to in this Section as "Table 1."
- **Table 3.x.2-y** - where '**3**' indicates the LRA section number, '**x**' indicates the subsection number from NUREG 1801, Volume 1, and '**2**' indicates that this is the second table type in Section 3; and '**y**' indicates the system table number. For example, for the Reactor Vessel, within the Reactor Coolant System subsection, this table would be 3.1.2-1 and for the Reactor Vessel Internals, it would be table 3.1.2-2. For the Containment Spray System, within the Engineered Safety Features subsection, this table would be 3.2.2-1. For the next system within the ESF subsection, it would be table 3.2.2-2. For ease of discussion, this table will hereafter be referred to in this section as "Table 2."

TABLE DESCRIPTION

NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," contains the staff's generic evaluation of the existing plant programs. It documents the technical basis for determining where existing programs are adequate without modification, and where existing programs should be augmented for the extended period of operation. The evaluation results documented in the report indicate that many of the existing programs are adequate to manage the aging effects for particular structures or components, within the scope of license renewal, without change. The report also contains recommendations on specific areas for which existing programs should be augmented for license renewal. In order to take full advantage of NUREG-1801, a comparison

between the AMR results and the tables of NUREG-1801 has been made. The results of that comparison are provided in the two tables.

Table 1 (Figure 3.0-1)

The purpose of Table 1 is to provide a summary comparison of how the ~~applicant's~~ facility aligns with the corresponding tables of NUREG-1801, Volume 1. The table is essentially the same as Tables 1 through 6 provided in NUREG-1801, Volume 1, except that the "Type" column has been replaced by an "Item Number" column and the "Item Number in GALL" column has been replaced by a "Discussion" column.

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

The "Discussion" column is used by the applicant to provide clarifying/amplifying information. The following are examples of information that might be contained within this column:

- "Further Evaluation Recommended" information or reference to where that information is located (including a hyperlink if possible)
- The name of a plant specific program being used (and a hyperlink to the program if possible)
- Exceptions to the NUREG-1801 assumptions
- A discussion of how the line is consistent with the corresponding line item in NUREG-1801, Volume 1, when that may not be intuitively obvious
- A discussion of how the item is different than the corresponding line item in NUREG-1801, Volume 1, when it may appear to be consistent (e.g., when there is exception taken to an aging management program that is listed in NUREG-1801, Volume 1)

The format of Table 1 provides the reviewer with a means of aligning a specific Table 1 row with the corresponding NUREG-1801, Volume 1 table row, thereby allowing for the ease of checking consistency.

Table 2 (Figure 3.0-2)

Table 2 provides the detailed results of the aging management reviews for those components identified in LRA Section 2 as being subject to aging management review. There will be a Table 2 for each of the subsystems within a "system" grouping. For example, for a PWR, the Engineered Safety Features System Group contains tables specific to Containment Spray, Containment Isolation, Emergency Core Cooling System, etc.

Table 2 consists of the following nine columns:

- Component Type
- Intended Function
- Material
- Environment
- Aging Effect Requiring Management
- Aging Management Programs
- NUREG-1801 Volume 2 Item
- Table 1 Item
- Notes

Component Type

The first column identifies all of the component types from Section 2 of the LRA that are subject to aging management review. They are listed in alphabetical order.

Intended Function

The second column contains the license renewal intended functions (including abbreviations where applicable) for the listed component types. Definitions and abbreviations of intended functions are contained within the Intended Functions table of LRA Section 2.

Material

The third column lists the particular materials of construction for the component type.

Environment

The fourth column lists the environment to which the component types are exposed. Internal and external service environments are indicated and a list of these environments is provided in the Internal Service Environments and External Service Environments tables of LRA Section 3.

Aging Effect Requiring Management

As part of the aging management review process, the applicant determines any aging effects requiring management for the material and environment combination in order to maintain the intended function of the component type. These aging effects requiring management are listed in column five.

Aging Management Programs

The aging management programs used to manage the aging effects requiring management are listed in column six of Table 2.

NUREG-1801 Vol 2 Item

Each combination of component type, material, environment, aging effect requiring management, and aging management program that is listed in Table 2, is compared to NUREG-1801, Volume 2 with consideration given to the standard notes, to identify consistencies. When they are identified, they are documented by noting the appropriate NUREG-1801, Volume 2 item number in column seven of Table 2. If there is no corresponding item number in NUREG-1801, Volume 2, this row in column seven is left blank. That way, a reviewer can readily identify where there is correspondence between the plant specific tables and the NUREG-1801, Volume 2 tables.

Table 1 Item

Each combination of component, material, environment, aging effect requiring management, and aging management program that has an identified NUREG-1801 Volume 2 item number must also have a Table 3.x.1 line item reference number. The corresponding line item from Table 1 is listed in column eight of Table 2. If there is no corresponding item in NUREG-1801, Volume 1, this row in column eight is left blank. That way, the information from the two tables can be correlated.

Notes

In order to realize the full benefit of NUREG-1801, each applicant needs to identify how the information in Table 2 aligns with the information in NUREG-1801, Volume 2. This is accomplished through a series of notes. All note references with letters are standard notes that will be the same from application to application throughout the industry. Any notes the plant requires which are in addition to the standard notes will be identified by a number and deemed plant specific.

TABLE USAGE

Table 1

The reviewer evaluates each row in Table 1 by moving from left to right across the table. Since the Component, Aging Effect/Mechanism, Aging Management Programs and Further Evaluation Recommended information is taken directly from NUREG-1801, Volume 1, no further analysis of those columns is required. The information intended to help the reviewer the most in this table is contained within the Discussion column. Here the reviewer will be given information necessary to determine, in summary, how the applicant's evaluations and programs align with NUREG-1801, Volume 1. This may be in the form of descriptive information within the Discussion column or the reviewer may be referred to other locations within the LRA for further information (including hyperlinks where possible/practical).

Table 2

Table 2 contains all of the Aging Management Review information for the plant, whether or not it aligns with NUREG-1801. For a given row within the table, the reviewer is able to see the intended function, material, environment, aging effect requiring management and aging management program combination for a particular component type within a system. In addition, if there is a correlation between the combination in Table 2 and a combination in NUREG-1801, Volume 2, this will be identified by a referenced item number in column seven, NUREG-1801, Volume 2 Item. The reviewer can refer to the item number in NUREG-1801, Volume 2, if desired, to verify the correlation. If the column is blank, the applicant was unable to locate an appropriately corresponding combination in NUREG-1801, Volume 2. As the reviewer continues across the table from left to right, within a given row, the next column is labeled Table 1 Item. If there is a reference number in this column, the reviewer is able to use that reference number to locate the corresponding row in Table 1 and see how the aging management program for this particular combination aligns with NUREG-1801. There may be a hyperlink directly to the corresponding row in Table 1 as well.

Table 2 provides the reviewer with a means to navigate from the components subject to Aging Management Review (AMR) in LRA Section 2 all the way through the evaluation of the programs that will be used to manage the effects of aging of those components.

A listing of the abbreviations used in this section is provided in Section 1.4.1.

Table 3.0-1 Internal Service Environments

Environment	Description
Air	Dry/filtered compressed air (identified as Dry Air), non-dried compressed air, and atmospheric air (when internal to components such as ventilation system components, components open to atmosphere, etc.). Moisture-laden air conditions are noted, when applicable.
Gas	Nitrogen, oxygen, hydrogen, carbon dioxide, helium, freon, or Halon gases. Also includes vent gases from process systems.
Lubricating Oil	All lubricating oils used for in-scope plant equipment.
Fuel Oil	All fuel oils used for in-scope plant equipment.
Raw Water[1]	From a river, lake, pond, or groundwater source. Raw water is not demineralized or chemically treated to any significant extent. In general, raw water is rough filtered to remove large particles. Biocides may be added to raw water to control micro-organisms or macro-organisms. Other designations of raw water include water that leaks from any system and condensation.
Sea Water[1]	Water from a bay, sound, or ocean source. Sea water is not demineralized or chemically treated to any significant extent. In general, sea water is rough filtered to remove large particles. Biocides may be added to sea water to control micro-organisms or macro-organisms.

Table 3.0-1 Internal Service Environments

Environment	Description
Treated water[1] (includes Steam)	Demineralized water or chemically purified water which is the source for water that may require further processing, such as for the primary or secondary coolant system. Treated water can be de-aerated, can include corrosion inhibitors, biocides, or boric acid, or can include a combination of treatments. Steam generated from treated water is included in this environment category. Examples of designations that are used to identify treated water in the Environment description sections of the aging management review results include: • treated water (borated water) - applies to primary systems water that is treated and monitored for quality under Primary Water Chemistry Aging Management Activity • treated water (component cooling) - applies to component cooling system water that is treated and monitored for quality under Closed-Cycle Cooling Water System Aging Management Activity • treated water (bearing cooling/chilled water) - applies to bearing cooling system and chilled water system water that is treated and monitored for quality under Closed-Cycle Cooling Water System Aging Management Activity • treated water (diesel cooling) - applies to local, self-contained diesel engine cooling water systems water that is treated and monitored for quality under Closed-Cycle Cooling Water System Aging Management Activity • treated water (secondary) - applies to secondary systems water that is within the scope of the Secondary Water Chemistry Aging Management Activity and controlled for protection of steam generators Other treated water applications use chemistry-controlled treated water as source water, but the water is not maintained as chemistry-controlled water.

1. While these are considered internal environments for plant systems, they may also be identified as external environments for certain structural members and system components that are submerged.

Table 3.0-2 External Service Environments

Environment[1]	Description
Air	Indoor air environments as described below: Sheltered Air - The sheltered air environment includes atmospheric air inside covered structures that provide protection from precipitation and wind. This environment is defined by a bulk average air temperature range of 40°F to 130°F and a 60-year maximum design ionizing dose of $3x10^7$ rads. Containment Air - The Containment air environment is defined by a bulk average air temperature range of 105°F to 120°F, except the pressurizer block house which can approach 150°F. Normal operating pressure is between -12 in. w.g. and 1.0 psig. The 60-year maximum design ionizing dose ranges between $6.6x10^5$ rads and $8.7x10^7$ rads. An exception is the area around the reactor vessel inside the primary shield wall for which the 60-year maximum design ionizing dose is $X.Xx10^9$ rads. NOTES 1.Certain structures or components may experience environmental conditions that deviate from the stated ranges or maximum values. The actual environmental condition(s) for these structures or components were used in the aging evaluation when the condition could affect the results, and, in those cases, the actual values are identified in the Environment description of the applicable LRA subsection. 2.Structural members may be associated with mechanical system components that may have the potential for condensation or intermittent wetting. Therefore, structural members have been conservatively assumed to be intermittently wetted in an air environment. 3.Mechanical components are assumed to be in an air environment that is not subject to intermittent wetting. Intermittently wetted conditions are noted, when applicable, such as from condensation.
Atmosphere / Weather	Air environment outside covered structures which includes precipitation and wind. Components and structures in this environment are subject to intermittent wetting. The outdoor air environment also includes exposure to ultraviolet radiation and ozone. This environment is bounded by a bulk average air temperature range of -5.1°F to 91°F and a 60-year maximum design ionizing dose of less than 150 rads.

Table 3.0-2 External Service Environments

Environment[1]	Description
Borated Water Leakage	The borated water leakage environment applies in all plant areas that include components and systems that contain borated water and that could leak on nearby components or structures. This environment is specified in the aging management review results only for materials susceptible to boric acid corrosion (carbon steel, low-alloy steels, and copper alloys). This environment is not considered for in-scope cables and connectors since cables are insulated, splices are sealed, and terminations are protected by enclosures.
Soil	The external environment for structures and components buried in the ground. Buried components (pipes and valves) are exposed to a soil environment and may be exposed to groundwater if they are located below the local groundwater elevation. The soil is assumed to entrain raw water and buried components are evaluated for the effects of corrosion. Concrete structural members below grade elevation are exposed to a soil environment and may be exposed to groundwater if they are located below the local groundwater elevation. The site groundwater is non-aggressive to concrete as determined by recent groundwater analyses. Steel piles are driven in undisturbed soil such that the soil environment surrounding the piles is deficient in oxygen at depths of a few feet below grade or below the water table. Therefore, the soil environment is not considered corrosive to steel piles.

1. For certain structural members and system components that are submerged, the applicable environment identified in Table 3.0-1, Internal Service Environments, is specified in the aging management review results.

Figure 3.0-1: Table 1

Table 3.x.1 Summary of Aging Management Evaluations in Chapter__ of NUREG-1801 for _____

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.x.1- 01					
3.x.1- 02					
3.x.1- 03					
3.x.1- 04					
3.x.1- 05					
3.x.1- 06					

Figure 3.0-2: Table 2

Table 3.x.2- y Section 3 Title - Plant Specific System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Volume 2 Item	Table 1 Item	Notes

3.2 AGING MANAGEMENT OF ENGINEERED SAFETY FEATURES SYSTEMS

3.2.1 INTRODUCTION

This section provides the results of the aging management review for those components identified in Section 2.3.2, Engineered Safety Features Systems, as being subject to aging management review. The systems, or portions of systems, which are addressed in this section, are described in the indicated sections.

- Containment Spray (CS) System (Section 2.3 2.1)
- Plant Specific System (Section 2.3 2.X)

Table 3.2.1, Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features, provides the summary of the programs evaluated in NUREG-1801 for the Engineered Safety Features component groups that are relied on for license renewal.

This table uses the format described in Section 3.0 above. Note that this table only includes those component groups that are applicable to a PWR.

3.2.2 RESULTS

The following tables summarize the results of the aging management review for systems in the ESF system group.

Table 3.2.2-1:, Engineered Safety Features - Containment Spray System - Summary of Aging Management Evaluation

Table 3.2.2-X:, Engineered Safety Features - Plant Specific System - Summary of Aging Management Evaluation

The materials that specific components are fabricated from, the environments to which components are exposed, the potential aging effects requiring management, and the aging management programs used to manage these aging effects are provided for each of the above systems in the following subsections of Section 3.2.2.1, Materials, Environment, Aging Effects Requiring Management and Aging Management Programs:

Section 3.2.2.1.1, Containment Spray System

Section 3.2 2.1.X, Plant Specific System

3.2.2.1 MATERIALS, ENVIRONMENT, AGING EFFECTS REQUIRING MANAGEMENT AND AGING MANAGEMENT PROGRAMS

3.2.2.1.1 Containment Spray System

Materials

The materials of construction for the Containment Spray System components are:

- carbon steel
- stainless steel

Environment

The Containment Spray System components are exposed to the following environments:

- air
- borated water leakage
- nitrogen
- raw water
- treated water (borated)
- treated water

Aging Effects Requiring Management

The following aging effects, associated with the Containment Spray System, require management:

- loss of material
- fouling

Aging Management Programs

The following aging management programs manage the aging effects for the Containment Spray System components.

- Boric acid corrosion
- Heat exchanger monitoring
- System testing
- System walkdown
- Water chemistry control
- Oil analysis

3.2.2.1.X Plant Specific System

Materials

Environment

Aging Effects Requiring Management

Aging Management Programs

3.2.2.2 FURTHER EVALUATION OF AGING MANAGEMENT AS RECOMMENDED BY NUREG-1801

NUREG-1801 provides the basis for identifying those programs that warrant further evaluation by the reviewer in the license renewal application. For the Engineered Safety Features, those programs are addressed in the following sections.

3.2.2.2.1 Cumulative Fatigue Damage

Fatigue is a TLAA as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c). The evaluation of this TLAA is addressed separately in Section 4.3.

3.2.2.2.2.1 Loss of Material Due to General Corrosion

Applicable to BWR Only

3.2.2.2.2.2 Loss of Material Due to General Corrosion

Typically, general corrosion is managed the Chemistry Control Program for Primary Systems, supplemented by the Work Control Process. In certain instances, the Above Ground Carbon Steel Tanks inspections and Infrequently Accessed Area Inspection Activities also manage these aging mechanisms.

3.2.2.2.3.1 Local Loss of Material due to Pitting and Crevice Corrosion

Applicable to BWR Only

3.2.2.2.3.2 Local Loss of Material due to Pitting and Crevice Corrosion

In general, pitting and crevice corrosion is managed via the Chemistry Control Program for Primary Systems, supplemented by the Work Control Process. In certain instances, the Tank Inspection program inspections and Infrequently Accessed Area Inspection Activities also manage these aging mechanisms.

3.2.2.2.4 Local Loss of Material due to Microbiologically Influenced Corrosion

Microbiologically influenced corrosion (MIC) can occur in carbon steel or stainless steel that is in raw or treated water. Credit is given to the Chemistry Control Program for Primary Systems and Chemistry Control Program for Secondary Systems, supplemented by the Work Control Process, with the management of MIC in treated water systems. MIC is managed in the normally isolated Containment isolation valves and the piping in the service water system (raw water) with the Service Water System (Open-Cycle Cooling Water) inspections and the Work Control Process.

The Work Control Process provides the opportunity to visually inspect the internal surfaces of components and adjoining piping during preventive and corrective maintenance activities, and to correct any identified deficiencies promptly. The process supports various mitigation activities and allows for periodic sampling and trending of component conditions.

Therefore, the current aging management programs successfully manage MIC in Containment isolation valves and piping.

3.2.2.2.5 Changes in Properties due to Elastomer Degradation

Applicable to BWR Only

3.2.2.2.6 Local Loss of Material due to Erosion

In general, the Flow Accelerated Corrosion Program manages the loss of material due to erosion. In specific cases, the Fire Protection Program and the Service Water System (Open-Cycle Cooling Water) inspections manage this aging effect.

3.2.2.2.7 Buildup of Deposits due to Corrosion

Applicable to BWR Only

3.2.2.3 TIME-LIMITED AGING ANALYSIS

The time-limited aging analyses (TLAA) identified below are associated with the ESF systems components. The section of the LRA that contains the TLAA review results is indicated in parenthesis.

- Fatigue (Section 4.3, Metal Fatigue)
- Leak-before break (Section 4.7.3, Leak-Before-Break)

3.2.3 CONCLUSION

The ESF piping, fittings, and components that are subject to aging management review have been identified in accordance with the requirements of 10 CFR 54.4. The aging

management programs selected to manage aging effects for the ESF components are identified in the summary tables and Section 3.2.2.1.

A description of these aging management programs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation.

Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the ESF components will be adequately managed so that there is reasonable assurance that the intended function(s) will be maintained consistent with the current licensing basis during the period of extended operation.

3.2.4 REFERENCES

1.

Table 3.2.1 Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1- 01	Piping, fittings, and valves in emergency core cooling system	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	This TLAA is further evaluated in Section 4.3. Low temperature portions are not susceptible to cumulative fatigue damage, for example, core flood. Further evaluation documented in Subsection 3.2.2.2.1
3.2.1- 02	BWR Only				
3.2.1- 03	Components in containment spray (PWR only), standby gas treatment (BWR only), containment isolation, and emergency core cooling systems	Loss of material due to general corrosion	Plant specific	Yes, plant specific	Consistent with NUREG-1801 for containment isolation. System walkdown program is credited. For further evaluation, see Appendix B. Not applicable for containment spray and ECCS as these components are not carbon steel in these systems. Further evaluation documented in Subsection 3.2.2.2.2.2
3.2.1- 04	BWR Only				

Table 3.2.1 Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1- 05	Components in containment spray (PWR only), standby gas treatment (BWR only), containment isolation, and emergency core cooling systems	Loss of material due to pitting and crevice corrosion	Plant specific	Yes, plant specific	Consistent with NUREG-1801 for containment isolation. Containment leak rate, wall thinning, and system walkdown programs are credited. For further evaluation, see Appendix B. Not applicable for containment spray and ECCS as these components are not carbon steel in these systems. Further evaluation documented in Subsection 3.2.2.2.3.2
3.2.1- 06	Containment isolation valves and associated piping	Loss of material due to microbiologically influenced corrosion (MIC)	Plant specific	Yes, plant specific	Consistent with NUREG-1801. Water chemistry control program is credited. For further evaluation, see Appendix B. Further evaluation documented in Subsection 3.2.2.2.4
3.2.1- 07	BWR Only				
3.2.1- 08	High pressure safety injection (charging) pump miniflow orifice	Loss of material due to erosion	Plant specific	Yes, plant specific	Not applicable as HPSI and LPSI pumps are not normally in use. Further evaluation documented in Subsection 3.2.2.2.6
3.2.1- 09	BWR Only				

Table 3.2.1 Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1- 10	External surface of carbon steel components	Loss of material due to general corrosion	Plant specific	Yes, plant specific	Consistent with NUREG-1801. System walkdown program is credited. See Appendix B. Further evaluation documented in Subsection 3.2.2.2.2.2
3.2.1- 11	Piping and fittings of CASS in emergency core cooling systems	Loss of fracture toughness due to thermal aging embrittlement	Thermal aging embrittlement of CASS	No	Not applicable as CASS is not used in this system.
3.2.1- 12	Components serviced by open-cycle cooling system	Local loss of material due to general, pitting, and crevice corrosion, MIC, and biofouling; buildup of deposit due to biofouling	Open-cycle cooling water system	No	Different programs are credited other than an open-cycle cooling water system. These are the heat exchanger monitoring, water chemistry control, and/or system testing programs. See Appendix B.
3.2.1- 13	Components serviced by closed-cycle cooling system	Loss of material due to general, pitting, and crevice corrosion	Closed-cycle cooling water system	No	Different programs are credited other than a closed-cycle cooling water system. These are water chemistry control, heat exchanger monitoring, and/or metal fatigue TLAA. See Appendix B.

Table 3.2.1 Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1- 14	BWR Only				
3.2.1-15	Pumps, valves, piping, and fittings, and tanks in containment spray and emergency core cooling systems	Crack initiation and growth due to SCC	Water chemistry	No	Consistent with NUREG-1801 where applicable. Not applicable for systems where temperature is below threshold for cracking.
3.2.1-16	BWR Only				
3.2.1-17	Carbon steel components	Loss of material due to boric acid corrosion	Boric acid corrosion	No	Boric acid corrosion program has exceptions to NUREG-1801 AMP. See Appendix B.
3.2.1- 18	Closure bolting in high pressure or high temperature systems	Loss of material due to general corrosion; crack initiation and growth due to cyclic loading and/or SCC	Bolting integrity	No	This item is not applicable as temperatures in these systems are not high enough to cause these aging effects.

Table 3.2.2-1: Engineered Safety Features - Containment Spray System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat exchangers (shell)	PB	Carbon steel	Air (external)	Loss of material	System walkdown	V.E.1-b	3.2.1- 10	A
			Borated water leakage (external)	Loss of material	Boric acid corrosion	V.A.6-d	3 2 1-17	B
			Raw water (internal)	Loss of material	Heat exchanger monitoring Water chemistry control	V.A 6-a	3.2.1- 12	E
			Treated water (internal)	Loss of material	Water chemistry control	V.A.6-c	3 2.1- 13	E

See Table 2.0-1 for definitions of intended function, Table 3.0-1 for definitions of internal environments and Table 3 0-2 for definitions of external environments.

Table 3.2.2-1: Engineered Safety Features - Containment Spray System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat exchangers (tubes)	HT	Stainless steel	Raw water (external)	Fouling	System testing Water chemistry control	V.A.6-b	3 2.1- 12	E, 2
			Treated water (external)	Fouling	Water chemistry control			H, 2
			Treated water (borated) (internal)	Fouling	Water chemistry control			H, 2
	PB	Stainless steel	Raw water (external)	Loss of material	Water chemistry control	V.A.6-a	3 2 1- 12	E
				Loss of material	Heat exchanger monitoring			H
			Treated water (external)	Loss of material	Heat exchanger monitoring	V.A 6-c	3.2.1- 13	E
				Loss of material	Water chemistry control			H
			Treated water (borated) (internal)	Loss of material	Water chemistry control	V.A.6-a V.A.6-c	3 2.1- 12 3 2.1- 13	E E, 3

See Table 2 0-1 for definitions of intended function, Table 3.0-1 for definitions of internal environments and Table 3 0-2 for definitions of external environments.

Table 3.2.2-1: Engineered Safety Features - Containment Spray System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping	PB	Stainless steel	Air (external)	None	None			G
			Air (internal)	None	None			G
			Nitrogen (internal)	None	None			G
			Treated water (borated) (internal)	Loss of material	Water chemistry control			H, I, 1
Pump casing	PB	Stainless steel	Air (external)	None	None			G
			Treated water (borated) (internal)	Loss of material	Water chemistry control			H, I, 1
Spray nozzles	FC PB	Stainless steel	Air (external and internal)	None	None			G

See Table 2 0-1 for definitions of intended function, Table 3 0-1 for definitions of internal environments and Table 3 0-2 for definitions of external environments.

Table 3.2.2-X: Engineered Safety Features - Plant Specific System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Volume 2 Item	Table 1 Item	Notes

See Table 2 0-1 for definitions of intended function, Table 3.0-1 for definitions of internal environments and Table 3.0-2 for definitions of external environments.

Notes for Tables 3.2.2-1 through 3.2.2-X

A. Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

B. Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.

C. Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

D. Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.

E. Consistent with NUREG-1801 for material, environment, and aging effect, but a different aging management program is credited.

F. Material not in NUREG-1801 for this component.

G. Environment not in NUREG-1801 for this component and material.

H. Aging effect not in NUREG-1801 for this component, material and environment combination.

I. Aging effect in NUREG-1801 for this component, material and environment combination is not applicable.

J. Neither the component nor the material and environment combination is evaluated in NUREG-1801.

Plant-specific notes:

1. The system temperature is below the threshold for cracking.
2. Fouling is not restricted to biofouling only.
3. NUREG-1801 differentiates between open and closed systems; however, both have borated water internally.
4. Component type, material, environment and aging effect combination not in NUREG-1801, but aging management program in NUREG-1801 is used.

See Table 2 0-1 for definitions of intended function, Table 3 0-1 for definitions of internal environments and Table 3.0-2 for definitions of external environments.

Results Tables: Electrical Components

Table 3.6.1 Summary of Aging Management Evaluations in Chapter VI of NUREG-1801 for Electrical Components

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.6.1- 01	Electrical equipment subject to 10 CFR 50.49 environmental qualification (EQ) requirements	Degradation due to various aging mechanisms	Environmental qualification of electric components	Yes, TLAA	EQ equipment is not subject to aging management review because it is not long-lived. EQ equipment is evaluated as a TLAA in Section 4.4. Further Evaluation documented in Subsection 3.6 2.2.1

Table 3.6.1 Summary of Aging Management Evaluations in Chapter VI of NUREG-1801 for Electrical Components

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.6.1- 02	Electrical cables and connections not subject to 10 CFR 50.49 EQ requirements	Embrittlement, cracking, melting, discoloration, swelling, or loss of dielectric strength leading to reduced insulation resistance (IR); electrical failure caused by thermal/ thermoxidative degradation of organics; radiolysis and photolysis (ultraviolet [UV] sensitive materials only) of organics; radiation-induced oxidation; moisture intrusion	Aging management program for electrical cables and connections not subject to 10 CFR 50.49 EQ requirements	No	Consistent with NUREG-1801.

Table 3.6.1 Summary of Aging Management Evaluations in Chapter VI of NUREG-1801 for Electrical Components

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.6.1- 03	Electrical cables used in instrumentation circuits not subject to 10 CFR 50.49 EQ requirements that are sensitive to reduction in conductor insulation resistance	Embrittlement, cracking, melting, discoloration, swelling, or loss of dielectric strength leading to reduced IR; electrical failure caused by thermal/ thermoxidative degradation of organics; radiation-induced oxidation; moisture intrusion	Aging management program for electrical cables used in instrumentation circuits not subject to 10 CFR 50.49 EQ requirements	No	Consistent with NUREG-1801 ~~for non-EQ nuclear instrumentation and radiation monitoring instrumentation cables only~~

Table 3.6.1 Summary of Aging Management Evaluations in Chapter VI of NUREG-1801 for Electrical Components

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.6.1- 04	Inaccessible medium-voltage (2 kV to 15 kV) cables (e.g., installed in conduit or direct buried) not subject to 10 CFR 50.49 EQ requirements	Formation of water trees; localized damage leading to electrical failure (breakdown of insulation) caused by moisture intrusion and water trees	Aging management program for inaccessible medium-voltage cables not subject to 10 CFR 50.49 EQ requirements	No	Consistent with NUREG-1801.
3.6.1- 05	Electrical connectors not subject to 10 CFR 50.49 EQ requirements that are exposed to borated water leakage	Corrosion of connector contact surfaces caused by intrusion of borated water	Boric acid corrosion	No	Consistent with NUREG-1801.

Table 3.6.2-1: Electrical Components - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Electrical cables and connections not subject to 10 CFR 50.49 EQ requirements	Provide electrical connections to specified sections of an electrical circuit to deliver voltage, current, or signals	Insulation material – various organic polymers	Heat or radiation or moisture	Reduced insulation resistance (IR), electrical failure	Electrical cables and connections not subject to 10 CFR 50.49 EQ requirements	VI.A.1-a.	3 6.1- 02	A
Electrical cables used in instrumentation circuits not subject to 10 CFR 50.49 EQ requirements that are sensitive to reduction in conductor insulation resistance	Provide electrical connections to specified sections of an electrical circuit to deliver voltage, current, or signals	Insulation material – various organic polymers	Heat or radiation or moisture	Reduced insulation resistance (IR), electrical failure	Electrical cables used in instrumentation circuits not subject to 10 CFR 50.49 EQ requirements	VI.A.1-b	3.6 1- 03	B

See Table 2.1-1 for definitions of intended function, Table 3.0-1 for definitions of internal environments and Table 3.0-2 for definitions of external environments.

Table 3.6.2-1: Electrical Components - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Electrical connectors not subject to 10 CFR 50 49 EQ requirements that are exposed to borated water leakage	Provide electrical connections to specified sections of an electrical circuit to deliver voltage, current, or signals	Connector pins – various metals	Borated water leakage	Connector failure	Boric Acid Corrosion	VI.A.2-a.	3 6 1- 05	A
High Voltage Insulators	~~Portion for SBO,~~ insulate and support an electrical conductor.	Porcelain Cement Steel	Outdoor	Surface contamination Cracking	Transmission Maintenance Program			J, 1
Inaccessible medium-voltage (2kV to 15kV) cables (e.g., installed in conduit or direct buried) not subject to 10 CFR 50.49 EQ requirements	Provide electrical connections to specified sections of an electrical circuit to deliver voltage, current, or signals	Insulation material – various organic polymers	Moisture and voltage stress	Electrical failure (breakdown of insulation)	Inaccessible medium-voltage cables not subject to 10 CFR 50.49 EQ requirements	VI A.1-c	3 6 1- 04	A

See Table 2 1-1 for definitions of intended function, Table 3.0-1 for definitions of internal environments and Table 3 0-2 for definitions of external environments.

Table 3.6.2-1: Electrical Components - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Uninsulated ground conductors	Provide electrical connections to specified sections of an electrical circuit to deliver voltage, current, or signals	Aluminum Copper	Various	None	None			J

See Table 2.1-1 for definitions of intended function, Table 3 0-1 for definitions of internal environments and Table 3.0-2 for definitions of external environments.

Notes for Tables 3.6.2-1 through 3.6.2-X:

A. Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

B. Consistent with NUREG-1801 item for component, material, environment, and aging effect AMP takes some exceptions to NUREG-1801 AMP.

C. Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

D. Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.

E. Consistent with NUREG-1801 for material, environment, and aging effect, but a different aging management program is credited.

F. Material not in NUREG-1801 for this component.

G Environment not in NUREG-1801 for this component and material.

H. Aging effect not in NUREG-1801 for this component, material and environment combination.

I. Aging effect in NUREG-1801 for this component, material and environment combination is not applicable.

J. Neither the component nor the material and environment combination is evaluated in NUREG-1801.

Plant-specific notes:

1. Program provided by transmission company.

See Table 2 1-1 for definitions of intended function, Table 3.0-1 for definitions of internal environments and Table 3 0-2 for definitions of external environments.

Standard License Renewal Application (SLRA)

Appendix B

Appendix B Description

Introduction

The License Renewal Application (LRA) standardization project focused on those areas of the LRA where the industry and NRC felt that review efficiency could be significantly improved by standardizing the format. Appendix B was one of those areas. The information contained within the Standard License Renewal Application (SLRA) is for illustrative purposes only. It is included to help the applicant and reviewer understand the proposed subsection format and the type of information that is recommended for inclusion in a plant specific LRA. While the data may be technically valid for one plant, it may not be technically valid for another.

Format

Appendix B of the SLRA consists of the following four subsections:

B1.0 Introduction
B2.0 Aging Management Programs
B3.0 TLAA Evaluation of Aging Management Programs Under 10 CFR 54.21(c)(1)(iii)
B4.0 References

B1.0 Introduction

This section provides an overview of Appendix B and provides general information to be used by the reviewer while navigating through Appendix B. It contains the following subsections:

- B1.1 Overview
- B1.2 Method of Discussion
- B1.3 Quality Assurance and Administrative Controls
- B1.4 Operating Experience
- B1.5 Aging Management Programs

B1.1 Overview

This subsection provides a general overview of the Introduction section of Appendix B.

B1.2 Method of Discussion

This subsection addresses the method for describing the Aging Management Programs (AMPs) in Appendix B. As part of the SLRA development effort, it was decided that there would be three ways to classify an aging management program. It would be either "consistent with NUREG-1801," "consistent with NUREG-1801, with exceptions" or "plant specific." This section states how the program descriptions will differ between those programs that are consistent with NUREG-1801 or are consistent with exceptions, and those that are plant specific.

B1.3 Quality Assurance Program and Administrative Controls

This subsection describes how the Quality Assurance Program and the plant Administrative Controls support License Renewal. It includes a discussion of the following topics:

- Corrective Actions
- Confirmation Process
- Administrative Controls

These items are discussed in the Introduction section of Appendix B because they apply throughout Appendix B.

B1.4 Operating Experience

This subsection describes how operating experience (industry and plant specific) was incorporated into the License Renewal process. This discussion is included in the Introduction section of Appendix B, because it applies throughout Appendix B.

B1.5 Aging Management Programs

This subsection contains a list of the sample plant programs credited for License Renewal. The programs are listed in alphabetical order and include a hyperlink to the section of Appendix B that contains the program description.

Only three programs are actually described in the SLRA. They are the "ASME Section XI, Subsections IWB, IWC & IWD Inservice Inspection Program" (consistent with NUREG-1801, with exceptions), the "Periodic Surveillance and Preventive Maintenance Program" (plant specific program) and the "Environmental Qualification Program" (consistent with NUREG 1801). All other programs in the list illustrate that they would be hyperlinked via highlighted text, but the hyperlinks do not actually function in the SLRA.

For each program in the list, there is an indicator in brackets that identifies the program as either existing or as being a new program for License Renewal.

B2.0 Aging Management Programs

This section contains a table that identifies the sample plant aging management programs, along with the corresponding NUREG-1801 program number and name (if applicable). The programs are listed in the program order of NUREG-1801. The programs that are consistent with NUREG-1801 or are consistent with exceptions, are listed first; followed by the plant specific programs. This section contains the following subsections:

- B2.1.1 ASME Section XI, Subsections IWB, IWC & IWD Inservice Inspection Program
- B2.1.2 ASME Section XI, Subsections IWE & IWL Inservice Inspection Program

B2.1.1 ASME Section XI, Subsections IWB, IWC & IWD Inservice Inspection Program

This program is consistent with exceptions to a NUREG-1801 program. Therefore, this section contains the following subsections:

- Program Description
- NUREG-1801 Consistency
- Exceptions to NUREG-1801
- Enhancements
- Operating Experience
- Conclusion

Program Description

This subsection contains a general description of the Aging Management Program (AMP).

NUREG-1801 Consistency

This subsection contains a statement regarding how consistent the plant specific AMP is with the corresponding NUREG-1801 AMP.

Exceptions to NUREG-1801

This subsection identifies the elements of the plant specific AMP that are not consistent with the NUREG-1801 AMP description. In addition, it describes why those exceptions are needed.

Enhancements

This subsection identifies enhancements that will be made to the plant specific program, processes or procedures in order to manage the effects of aging on the associated SSCs during the period of extended operation. Specific program elements that will be enhanced are identified.

Operating Experience

This subsection discusses operating experience related to the program.

Conclusion

This subsection states a general conclusion as to how the program will manage the effects of aging on the SSCs within the scope of the program, for the period of extended operation.

B2.1.1 Periodic Surveillance and Preventive Maintenance Program

This is a plant specific AMP. Therefore, this section contains the following subsections:

- Program Description
- Aging Management Program Elements
- Enhancements
- Conclusion

Program Description

This subsection contains a general description of the plant specific AMP.

Aging Management Program Elements

This subsection contains a discussion of the plant specific AMP in terms of the ten program elements of NUREG-1800, "Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants."

Enhancements

This subsection identifies any enhancements that will be made to the plant specific program, processes or procedures in order to manage the effects of aging on SSCs during the period of extended operation. Specific program elements that will be enhanced are identified.

Conclusion

This subsection states a general conclusion as to how the program will manage the effects of aging on the associated SSCs, for the period of extended operation.

B3.0 TLAA Evaluation of Aging Management Programs Under 10 CFR 54.21(c)(1)(iii)

This section addresses programs credited in the evaluation of Time Limited Aging Analyses (TLAAs). Only one example program is included in this section of the SLRA (B3.1 Environmental Qualification Program). It is provided as a model for any additional TLAA programs that would be included in the LRA.

This section contains the following subsection:

- B3.1 Environmental Qualification Program

If applicants have additional TLAA AMPs, those programs would be addressed sequentially as B3.2, B3.3, B3.4, etc.

B3.1 Environmental Qualification Program

This section describes the sample plant Environmental Qualification Program as it pertains to managing the effects of aging on the associated in-scope SSCs, for the period of extended operation. Since it is consistent with a NUREG-1801 AMP, this section is divided into the following subsections:

- Program Description
- NUREG-1801 Consistency
- Exceptions to NUREG-1801
- Enhancements
- Operating Experience
- Conclusion

B4.0 References

This section lists all of the references used throughout Appendix B.

Appendix B Example

B1.0 INTRODUCTION

B1.1 Overview

License Renewal aging management program descriptions are provided in this appendix for each program credited for managing aging effects based upon the aging management review results provided in Sections 3.1 through 3.6 of this application.

Each aging management program described in this section has ten elements which are consistent with the definitions in Section A.1, "Aging Management Review - Generic," Table A.1-1, "Elements of an Aging Management Program for License Renewal," of the NUREG-1800, SRP-LR (Reference 1). The 10 element detail is only provided when the program is plant specific. See [Section B1.2] below.

B1.2 Method of Discussion

For those Aging Management programs that are consistent with the assumptions made in Sections X and XI of NUREG-1801, or are consistent with exceptions, each program discussion is presented in the following format:

- A Program Description abstract of the overall program form and function is provided.
- A NUREG-1801 Consistency statement is made about the program.
- Exceptions to the NUREG-1801 program are outlined and a justification is provided.
- Enhancements to ensure consistency with NUREG-1801 or additions to the NUREG-1801 program to manage aging for additional components with aging effects not assumed in NUREG-1801 for the NUREG-1801 program. A proposed schedule for completion is discussed.
- Operating Experience information specific to the program is provided.
- A Conclusion section provides a statement of reasonable assurance that the program is effective, or will be effective, once enhanced.

For those programs that are plant specific, the above form is generally followed with the additional discussion of each of the ten elements.

B1.3 Quality Assurance Program and Administrative Controls

The Quality Assurance Program implements the requirements of 10 CFR 50, Appendix B, and is consistent with the summary in Appendix A.2 of NUREG-1800 (Reference 1). The Quality Assurance Program includes the elements of corrective action, confirmation process, and administrative controls, and is applicable to the safety-related and non-safety-related systems, structures, and components that are subject to aging

management review. In many cases, existing activities were found adequate for managing aging effects during the period of extended operation. Generically the three elements are applicable as follows:

Corrective Actions:

A single corrective actions process is applied regardless of the safety classification of the structure or component. Corrective actions are implemented through the initiation of an Action Request (AR) in accordance with plant procedures established in response to 10 CFR 50, Appendix B. Plant procedures require the initiation of an AR for actual or potential problems, including unexpected plant equipment degradation, damage, failure, malfunction or loss. Site documents that implement aging management activities for license renewal will direct that an AR be prepared in accordance with those procedures whenever non-conforming conditions are found (i.e., the acceptance criteria are not met).

Equipment deficiencies are corrected through the initiation of a Work Order (WO) in accordance with plant procedures. Although equipment deficiencies may initially be documented by a WO, the corrective action process specifies that an AR also be initiated if required.

Confirmation Process:

The focus of the confirmation process is on the follow-up actions that must be taken to verify effective implementation of corrective actions. The measure of effectiveness is in terms of correcting the adverse condition and precluding repetition of significant conditions adverse to quality. Plant procedures include provisions for timely evaluation of adverse conditions and implementation of any corrective actions required, including root cause determinations and prevention of recurrence where appropriate (e.g., significant conditions adverse to quality). These procedures provide for tracking, coordinating, monitoring, reviewing, verifying, validating, and approving corrective actions, to ensure effective corrective actions are taken. The AR process is also monitored for potentially adverse trends. The existence of an adverse trend due to recurring or repetitive adverse conditions will result in the initiation of an AR. The aging management activities required for license renewal would also uncover any unsatisfactory condition due to ineffective corrective action.

Since the same 10 CFR 50, Appendix B corrective actions and confirmation process is applied for nonconforming SR and NSR structures and components subject to an Aging Management Review (AMR) for license renewal, the corrective action program is consistent with the NUREG-1801 elements.

Administrative Controls:

Administrative controls procedures provide information on procedures and other forms of administrative control documents, as well as guidance on classifying documents into the

proper document type. Procedure attachments provide a chart showing the administrative controls hierarchy and a document type decision tree.

B1.4 Operating Experience

Industry operating experience was incorporated into the License Renewal process through a review of industry documents to identify aging effects and mechanisms that could challenge the intended function of systems and structures within the scope of License Renewal. Review of plant specific operating experience was performed to identify aging effects experienced. The review of plant specific operating experience involved electronic database searches of plant information. In addition, discussions with system engineers and long time company employees were conducted, and identified some additional aging concerns.

Operating experience of the program/activity, including past corrective actions resulting in program enhancements, were considered. This information provides objective evidence that the effects of aging have been, and will continue to be, adequately managed.

B1.5 Aging Management Programs

The following aging management programs are described in the sections listed in this appendix. The programs are either discussed in NUREG -1801 or are site specific. Plant specific programs are listed at the end of the table in Section B2.0. Programs are identified as either existing or new.

1. ASME Section XI, Subsections IWB, IWC, & IWD Inservice Inspection Program [Section B2.1.1] [Existing]
2. ASME Section XI, Subsections IWE & IWL Inservice Inspection Program [Section B2.1.2] [Existing]
3. ASME Section XI, Subsection IWF Inservice Inspection Program [Section B2.1.3] [Existing]
4. Bolting Integrity Program [Section B2.1.4] [New]
5. Boraflex Monitoring Program [Section B2.1.5] [New]
6. Boric Acid Corrosion Program [Section B2.1.6] [Existing]
7. Buried Services Monitoring Program [Section B2.1.7] [New]
8. Cable Condition Monitoring Program [Section B2.1.8] [New]
9. Closed-Cycle Cooling Water System Surveillance Program [Section B2.1.9] [New]

10. Fire Protection Program [Section B2.1.11] [Existing]
11. Flow-Accelerated Corrosion Program [Section B2.1.12] [Existing]
12. Fuel Oil Chemistry Control Program [Section B2.1.13] [Existing]
13. One-Time Inspection Program [Section B2.1.14] [New]
14. Open-Cycle Cooling (Service) Water System Surveillance Program [Section B2.1.15][New]
15. Periodic Surveillance and Preventive Maintenance Program [Section B2.1.2] [Existing]
16. Reactor Coolant System CASS Embrittlement Program [Section B2.1.17] [New]
17. Reactor Coolant System Alloy 600 Inspection Program [Section B2.1.18] [New]
18. Reactor Vessel Internals Program [Section B2.1.19] [Enhanced]
19. Reactor Vessel Surveillance Program [Section B2.1.20] [Existing]
20. Steam Generator Integrity Program [Section B2.1.21] [Existing]
21. Structures Monitoring Program [Section B2.1.22] [Existing]
22. Systems Monitoring Program [Section B2.1.23] [Existing]
23. Tank Internal Inspection Program [Section B2.1.24] [New]
24. Thimble Tube Inspection Program [Section B2.1.25] [Existing]
25. Water Chemistry Control Program [Section B2.1.26] [Existing]

B1.6 Time Limited Aging Analyses Aging Management Programs:

1. Environmental Qualification Program [Section B3.1] [Existing]
2. Fatigue Monitoring Program [Section B3.2] [Existing]
3. Pre-Stressed Concrete Containment Tendon Surveillance Program [Section B3.3] [Existing]

B2.0 AGING MANAGEMENT PROGRAMS

The correlation between NUREG-1801 (Generic Aging Lessons Learned (GALL) programs and sample plant programs is shown below. For the sample plant programs, links to appropriate sections of this appendix are provided.

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	PLANT PROGRAM
XI.M1	ASME Section XI Inservice Inspection, Subsections IWB, IWC, & IWD	ASME Section XI, Subsections IWB, IWC, & IWD Inservice Inspection Program [Section B2.1.1]
XI.M2	Water Chemistry	Water Chemistry Control Program [Section B2.1.26]
XI.M3	Reactor Head Closure Studs	ASME Section XI, Subsections IWB, IWC, & IWD Inservice Inspection Program [Section B2.1.1]
XI.M4	BWR Vessel ID Attachment Welds	Not Applicable, Sample is a PWR.
XI.M5	BWR Feedwater Nozzle	Not Applicable, Sample is a PWR.
XI.M6	BWR Control Rod Drive Return Line Nozzle	Not Applicable, Sample is a PWR.
XI.M7	BWR Stress Corrosion Cracking	Not Applicable, Sample is a PWR.
XI.M8	BWR Penetrations	Not Applicable, Sample is a PWR.
XI.M9	BWR Vessel Internals	Not Applicable, Sample is a PWR.
XI.M10	Boric Acid Corrosion	Boric Acid Corrosion Program [Section B2.1.6]
XI.M11	Nickel-Alloy Nozzles and Penetrations	Reactor Coolant System Alloy 600 Inspection Program [Section B2.1.18]
XI.M12	Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)	Reactor Coolant System CASS Embrittlement Program [Section B2.1.17]
XI.M13	Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS)	Reactor Vessel Internals Program [Section B2.1.19]

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	PLANT PROGRAM
XI.M14	Loose Parts Monitoring	Not Applicable-not credited for aging management. Reactor Vessel Internals Program [Section B2.1.19] was determined to be adequate to manage identified aging effects.
XI.M15	Neutron Noise Monitoring	Not Applicable-not credited for aging management. Reactor Vessel Internals Program [Section B2.1.19] was determined to be adequate to manage identified aging effects.
XI.M16	PWR Vessel Internals	Reactor Vessel Internals Program [Section B2.1.19]
XI.M17	Flow-Accelerated Corrosion	Flow-Accelerated Corrosion Program [Section B2.1.12]
XI.M18	Bolting Integrity	ASME Section XI, Subsections IWB, IWC, & IWD Inservice Inspection Program [Section B2.1.1] Systems Monitoring Program [Section B2.1.23] Structures Monitoring Program [Section B2.1.22] ASME Section XI, Subsection IWF Inservice Inspection Program [Section B2.1.3] Periodic Surveillance and Preventive Maintenance Program [Section B2.1.2]
XI.M19	Steam Generator Tube Integrity	Steam Generator Integrity Program [Section B2.1.21]
XI.M20	Open-Cycle Cooling Water System	Open-Cycle Cooling (Service) Water System Surveillance Program [Section B2.1.15]
XI.M21	Closed-Cycle Cooling Water System	Closed-Cycle Cooling Water System Surveillance Program [Section B2.1.9]

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	PLANT PROGRAM
XI.M22	Boraflex Monitoring	Boraflex Monitoring Program [Section B2.1.5]
XI.M23	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems	Structures Monitoring Program [Section B2.1.22]
XI.M24	Compressed Air Monitoring	Not Credited for Aging Management
XI.M25	BWR Reactor Water Cleanup System	Not Applicable, Sample is a PWR.
XI.M26	Fire Protection	Fire Protection Program [Section B2.1.11]
XI.M27	Fire Water System	Fire Protection Program [Section B2.1.11]
XI.M28	Buried Piping and Tanks Surveillance	Not Applicable-See XI.M34.
XI.M29	Aboveground Carbon Steel Tanks	Systems Monitoring Program [Section B2.1.23] Tank Internal Inspection Program [Section B2.1.24]
XI.M30	Fuel Oil Chemistry	Fuel Oil Chemistry Control Program [Section B2.1.13]
XI.M31	Reactor Vessel Surveillance	Reactor Vessel Surveillance Program [Section B2.1.20]
XI.M32	One-Time Inspection	One-Time Inspection Program [Section B2.1.14]
XI.M33	Selective Leaching of Materials	One-Time Inspection Program [Section B2.1.14]
XI.M34	Buried Piping and Tanks Inspection	Buried Services Monitoring Program [Section B2.1.7]
XI.E1	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Cable Condition Monitoring Program [Section B2.1.8]
XI.E2	Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits	Cable Condition Monitoring Program. [Section B2.1.8]

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	PLANT PROGRAM
XI.E3	Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Cable Condition Monitoring Program [Section B2.1.8]
XI.S1	ASME Section XI, Subsection IWE	ASME Section XI, Subsections IWE & IWL Inservice Inspection Program [Section B2.1.2]
XI.S2	ASME Section XI, Subsection IWL	ASME Section XI, Subsections IWE & IWL Inservice Inspection Program[Section B2.1.2]
XI.S3	ASME Section XI, Subsection IWF	ASME Section XI, Subsection IWF Inservice Inspection Program [Section B2.1.3]
XI.S4	10 CFR 50, Appendix J	ASME Section XI, Subsections IWE & IWL Inservice Inspection Program [Section B2.1.2]
XI.S5	Masonry Wall Program	Structures Monitoring Program [Section B2.1.22]
XI.S6	Structures Monitoring Program	Structures Monitoring Program [Section B2.1.22]
XI.S7	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants	Structures Monitoring Program [Section B2.1.22]
XI.S8	Protective Coating Monitoring and Maintenance	Not Applicable-no credit is taken for protective coatings inside containment to prevent aging effects.
Chapter X		
X.M1	Metal Fatigue of Reactor Coolant Pressure Boundary	Fatigue Monitoring Program [Section B3.2]
X.E1	Environmental Qualification (EQ) of Electrical Components	Environmental Qualification Program [Section B3.3]
X.S1	Concrete Containment Tendon Prestress	Pre-Stressed Concrete Containment Tendon Surveillance Program [Section B3.1]

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	PLANT PROGRAM
NA	Plant Specific Program	Thimble Tube Inspection Program [Section B2.1.25]
NA	Plant Specific Program	Tank Internal Inspection Program [Section B2.1.24]
NA	Plant Specific Program	Periodic Surveillance and Preventive Maintenance Program [Section B2.1.2]
NA	Plant Specific Program	Systems Monitoring Program [Section B2.1.23]

B2.1 Aging Management Programs

B2.1.1 ASME Section XI, Subsections IWB, IWC, and IWD Inservice Inspection Program

Program Description

The ASME Section XI, Subsections IWB, IWC, & IWD Inservice Inspection (ISI) Program inspections are performed to identify and correct degradation in Class 1, 2, and 3 piping, components and their integral attachments. The program includes periodic visual, surface and/or volumetric examinations and leakage tests of all Class 1, 2 and 3 pressure-retaining components, and their integral attachments, including welds, pump casings, valve bodies, and pressure-retaining bolting. These components and their integral attachments are identified in ASME Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, or commitments requiring augmented inservice inspections in accordance with ASME Section XI, and are within the scope of License Renewal.

NUREG-1801 Consistency

The ASME Section XI, Subsections IWB, IWC, and IWD Inservice Inspection Program is an existing program that is consistent with exceptions, to NUREG-1801, Section XI.M1 (ASME Section XI Inservice Inspections Program, Subsections IWB, IWC, and IWD), and XI.M3 (Reactor Head Closure Studs) (Reference 3).

Exceptions to NUREG-1801

The exception to NUREG-1801 is that the sample plant ISI Program is based on the 1998 edition through 2000 addenda of ASME Section XI. NUREG-1801 uses the 1989 edition of ASME Section XI with 1995 edition through 1996 addenda changes noted. Use of the later edition code was found acceptable by the NRC in an SER dated November 5, 2001 (Reference 4).

Program Elements Affected

- **Detection of Aging Effects**
  The NDE techniques used to inspect the Class 1 (Table IWB-2500-1 components), Class 2 (Table IWC-2500-1 components), and Class 3 (Table IWD-2500-1 components) are consistent with the referenced ASME Section XI Code for those

components. Therefore, the inservice inspections performed are consistent with the NUREG-1801 program except for the differences listed below.

The sample plant ISI Program for the 4th Inspection Interval will meet the requirements of the 1998 edition through 2000 addenda of ASME Section XI, as modified by Risk Informed Inservice Inspection (RI-ISI) criteria for Examination Categories B-J, B-F, C-F-1, and C-F-2, and the additional requirements of 10 CFR 50.55a. The periodicity of most examinations is once per interval, with the exception of examination categories B-P, C-H, and D-B (98A00 edition). These include visual VT-2 examination of all pressure-retaining components each period during the system leakage test. The sample plant ISI Program specifies performance of the system leakage test once per refueling outage or each period for these examination categories, whichever applies.

a. Class 1, 2 and 3 Butt-Welded Piping

   For Class 1, 2 and 3 butt-welded piping, the sample plant will implement RI-ISI. RI-ISI can reduce the number of piping welds where volumetric examination is required, based on an assessment of the probability of failure of these welds and the safety consequences of failure of these welds. RI-ISI can completely eliminate the surface examination of piping butt welds from the ISI Program. RI-ISI will credit enhancements to the VT-2 examinations performed during each refueling outage as well as enhancements to routine visual examinations performed by operations and system engineering personnel. RI-ISI applies to Categories B-J, B-F, C-F-1 and C-F-2 (98A00 edition). (Note: It will not apply to Class 3 components.)

b. Reactor Vessel Head Closure Studs

   The sample plant's treatment of Reactor Vessel Head Closure Studs is consistent with ASME Section XI 1998 edition through 2000 addenda, which requires either a surface or volumetric examination, but not both. Volumetric examinations are performed using Performance Demonstration Initiative (PDI) techniques in accordance with ASME Section XI, Appendix VIII and 10 CFR 50.55a.

c. Class 1, 2 and 3 Pressure-Retaining Bolting

   This element is consistent with the NUREG-1801 AMP for Class 1, 2 and 3 pressure-retaining bolting, except that Risk-Informed ISI will be implemented for Examination Categories B-F, B-J, C-F-1, and C-F-2, for the 4th Inspection Interval. The version of ASME Section XI referenced in NUREG-1801 AMP XI.M3, requires volumetric and surface exams of Reactor Vessel Head

Closure Studs. The 98A00 version of the code only requires surface or volumetric examinations, but not both. Also, elimination of the surface examination will reduce the potential for handling-induced defects to the studs.

Enhancements

Enhancements to the ASME Section XI, Subsections IWB, IWC, and IWD Inservice Inspection Program include revisions to existing activities which will be credited for license renewal to ensure that the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

- **Corrective Actions**
  Documents that implement aging management activities for license renewal shall direct that an Action Request (AR) be prepared in accordance with plant procedures whenever the acceptance criteria are not met.

Enhancements are scheduled for completion prior to the period of extended operation.

Operating Experience

Both industry and sample plant-specific operating experience relating to the ASME Section XI, Subsections IWB, IWC, and IWD Inservice Inspection Program was reviewed.

A search of action requests and Maintenance Work Orders on Reactor Vessel Head Closure Studs for both Units revealed that no degradation of the studs or nuts was present. The examinations and inspections are conducted according to the requirements specified in Table IWB-2500-1.

The review of plant-specific operating experience revealed two instances where ISI examinations discovered flaws through means other than the system leakage test. Flaw indications were discovered in each reactor vessel outlet nozzle-to-shell weld during the ultrasonic examination of reactor vessel welds. A fracture mechanics evaluation was performed that demonstrated that the flaws posed no threat to continued safe operation of the reactor vessel.

As a result of industry experience review and additional examinations, some degradation (a crack) was discovered via radiography performed on a Masoneilan containment isolation valve seat cavity. The radiographic examination was performed as a result of industry experience with cracking caused by thermal cycling in similar valves. Sample

plant personnel determined the affected valve remained operable based on an analysis that predicted very slow growth of this flaw.

The ISI Program is frequently updated to account for industry operating experience. ASME Section XI is also revised every three years and addenda issued in the interim, which allows the code to be updated to reflect operating experience. The requirement to update the ISI Programs to reference more recent editions of ASME Section XI at the end of each inspection interval, ensures the ISI Program reflects enhancements due to operating experience that has been incorporated into ASME Section XI.

A sample plant NRC inspection reviewed the Inservice Inspection Program. No violations were identified and the implementation of the Program was found to meet ASME Code Requirements.

A review of NRC Inspection Reports, QA Audit/Surveillance Reports, and Self-Assessments since 1999 revealed no issues or findings that could impact the effectiveness of the ASME Section XI, Subsections IWB, IWC, and IWD Inservice Inspection Program. As additional operating experience is obtained, lessons learned will be used to adjust this program, as needed.

Conclusion

The ASME Section XI, Subsections IWB, IWC, and IWD Inservice Inspection Program has been effective in managing aging effects, including loss of material due to corrosion, erosion or wear; cracking; and loss of mechanical closure integrity at bolted or welded connections due to wastage from borated coolant leakage, wear, or stress relaxation.

The continued implementation of the ASME Section XI, Subsections IWB, IWC, and IWD Inservice Inspection Program provides reasonable assurance that the aging effects will be managed, such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.2 Periodic Surveillance and Preventive Maintenance Program

Program Description

The Periodic Surveillance and Preventive Maintenance Program is an existing plant-specific program that consists of the appropriate ten elements described in Appendix A of NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants." The Periodic Surveillance and Preventive Maintenance Program manages aging effects for SSCs within the scope of license renewal. The program provides for visual inspection and examination of surfaces of

selected equipment items and components, including fasteners, for evidence of defects and age-related degradation on a specified frequency based on operating experience. Leak inspections of piping and components in selected portions of systems are also performed on a specified frequency. Additionally, the program provides for replacement or refurbishment of certain components on a specified frequency, based on operating experience. The Periodic Surveillance and Preventive Maintenance Program is also used to verify the effectiveness of other aging management programs.

Aging Management Program Elements

The key elements of aging management activities, which are used in the Periodic Surveillance and Preventive Maintenance Program, are described below. The results of an evaluation of each key element against the appropriate ten elements described in Appendix A of NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants," is provided below.

Scope of Program

The Periodic Surveillance and Preventive Maintenance Program manages aging effects for SSCs within the scope of license renewal. The program provides for visual inspection and examination of surfaces of selected equipment items and components, including fasteners, for evidence of defects and age-related degradation, on a specified frequency, based on operating experience. Leak inspections of piping and components in selected portions of systems are also performed on a specified frequency. Additionally, the program provides for replacement or refurbishment of certain components on a specified frequency, based on operating experience. The Periodic Surveillance and Preventive Maintenance Program is also used to verify the effectiveness of other aging management programs.

Preventive Actions

The Periodic Surveillance and Preventive Maintenance Program is a condition monitoring program. There are no preventive measures, as part of this program, associated with the aging effects of concern for license renewal. The visual inspection and examination of surfaces of selected equipment items and components, including fasteners, and leak inspections of piping and components in selected portions of systems on a specified frequency, are

intended to identify the extent to which aging effects are occurring (i.e. condition). The replacement or refurbishment of certain components on a specified frequency does not prevent aging effects from occurring. These components are replaced or refurbished on a given frequency based on operating experience.

Parameters Monitored, Inspected, and/or Tested

Surface conditions of selected equipment items and components, including fasteners, are monitored through visual inspection and examination for evidence of defects and age-related degradation, on a specified frequency, based on operating experience. Piping and components in selected portions of systems are monitored through visual inspection for evidence of leaks on a specified frequency. Certain components are replaced or refurbished on a given frequency based on operating experience.

Detection of Aging Effects

The aging effects of concern will be detected by visual inspection and examination of surfaces of selected equipment items, piping and components, including fasteners, for evidence of age-related degradation. Guidelines provided in the Westinghouse Aging Assessment Field Guides may be used as an aid in the identification of undesirable conditions.

The periodicity of most surveillance and preventive maintenance activities that are credited for license renewal will usually be driven by considerations other than aging, since the effects of aging usually occur slowly over time. For example, a check valve internal inspection is more likely to be driven by seat/disc/hinge pin wear than by erosion or corrosion of the valve body. Therefore, the specified frequencies of surveillance and preventive maintenance activities credited for license renewal may be adjusted or the performance of these activities deferred subject to the following constraints.

The frequency of surveillance and preventive maintenance activities that are credited for license renewal may be adjusted provided an engineering evaluation is performed justifying the revised frequency based on plant and industry operating experience.

Monitoring and Trending

The Periodic Surveillance and Preventive Maintenance Program is a condition monitoring program. Detailed material surface condition and leakage inspections and examinations, and component replacement or refurbishment activities are performed on a specified frequency based on operating experience. The results of these surveillance and preventive maintenance activities are documented, and subject to review and approval.

Acceptance Criteria

Acceptance criteria for visual inspection and examination of surfaces of selected equipment items and components, including fasteners, and leak inspections of piping and components in selected portions of systems, are provided in the surveillance and preventive maintenance activities credited for license renewal. The acceptance criteria are related to the aging effect(s) of concern and are tailored to each individual inspection and examination, considering the aging effect(s) being managed.

Corrective Actions

Corrective actions are implemented in accordance with the requirements of 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," and ANSI N18.7-1976, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants," as committed in the FSAR. Provisions for timely evaluation of adverse conditions and implementation of any corrective actions required, including root cause determinations and prevention of recurrence where appropriate, are included in the corrective action program.

Corrective actions are implemented through the initiation of an Action Request in accordance with the corrective action program. Equipment deficiencies are corrected through the initiation of a Work Order in accordance with Plant procedures.

Confirmation Process

The confirmation process is part of the corrective action program, which is implemented in accordance with the requirements of 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," and ANSI N18.7-1976, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants," as committed in the FSAR. The aging management activities required by this program would also uncover any unsatisfactory condition due to ineffective corrective action.

The Action Request Process includes provisions for tracking, coordinating, monitoring, reviewing, verifying, validating, and approving corrective actions, to ensure effective corrective actions are taken. The Action Request Process is also monitored for potentially adverse trends. The existence of an adverse trend due to recurring or repetitive adverse conditions will result in the initiation of an Action Request. The Periodic Surveillance and Preventive Maintenance Program includes provisions for verifying the completion and effectiveness of corrective actions for equipment deficiencies. This procedure establishes criteria for the selection and documentation of Post-Maintenance Tests (PMTs), guidelines to ensure equipment will perform its intended function prior to return to service, and guidelines to ensure the original equipment deficiency is corrected and that a new deficiency has not been created.

Administrative Controls

The Periodic Surveillance and Preventive Maintenance Program is implemented through various plant administrative procedures. These implementing documents are subject to administrative controls, including a formal review and approval process, in accordance with the requirements of 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," and ANSI N18.7-1976, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants," as committed to in the FSAR.

Various procedures provide the required administrative controls, including a formal review and approval process, for procedures and other forms of administrative control documents.

Operating Experience

The Periodic Surveillance and Preventive Maintenance Program has been effective in maintaining the intended functions of long-lived passive SSCs, with an improving trend noted in the internal and external assessments performed over the past several years. Many Condition Reports, Action Requests and Work Orders have been generated and resolved through the implementation of this program, which demonstrates the effectiveness of this program to identify and correct age-related degradation prior to a loss of intended function. The effectiveness of this program is also demonstrated by the level of system/equipment availability as documented via the Maintenance Rule Periodic Assessments.

Enhancements

Program Elements Affected

Revise applicable existing procedures to ensure that the procedures address the following elements:

- **Detection of Aging Effects**
  Surveillance and preventive maintenance activities credited for license renewal aging management will be specified by call-ups maintained in the equipment database, flagged as license renewal commitments, and subject to additional requirements and controls, including the constraints placed on deferrals, cancellations and frequency changes for license renewal.

  The frequency of surveillance and preventative maintenance activities credited for license renewal may be adjusted or the activity cancelled provided an engineering evaluation is performed justifying the revised frequency based on plant and industry operating experience.

- **Acceptance Criteria**
  Acceptance criteria shall be specified in the surveillance and preventive maintenance activities credited for license renewal. The acceptance criteria shall be related to the aging effect(s) of concern and tailored to each individual inspection and examination considering the aging effect(s) being managed.

- **Corrective Actions**
  Documents that implement aging management activities for license renewal shall direct that an Action Request (AR) be prepared in accordance with plant procedures whenever the acceptance criteria are not met.

- **Confirmation Process**
  The Periodic Surveillance and Preventive Maintenance Program shall be periodically audited by the Nuclear Oversight Group to insure its effectiveness and continued improvement.

Enhancements are scheduled for completion prior to the period of extended operation.

Conclusion

The Periodic Surveillance and Preventive Maintenance Program is an existing program. It uses, as its bases, various INPO and industry standards, including ANSI N18.7-1976, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants."

The Periodic Surveillance and Preventive Maintenance Program has been effective in maintaining the intended functions of long-lived passive SSCs, with an improving trend noted in the internal and external assessments performed over the past several years. NRC Inspection Reports, QA Audit/Surveillance Reports, and Self-Assessments since 1999, and INPO evaluation reports were reviewed to assess the effectiveness of the Periodic Surveillance and Preventive Maintenance Program. Many surveillance and preventive maintenance activities were noted as being effectively performed.

Therefore, there is reasonable assurance that aging effects will be managed by the Periodic Surveillance and Preventive Maintenance Program such that SSCs within the scope of license renewal will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B3.0 TLAA EVALUATION OF AGING MANAGEMENT PROGRAMS UNDER 10 CFR 54.21(C)(1)(iii)

B3.1 Environmental Qualification Program

Program Description

The Environmental Qualification (EQ) Program manages component thermal, radiation and cyclical aging, as applicable, through the use of aging evaluations based on 10 CFR 50.49(f) qualification methods. As required by 10 CFR 50.49, EQ components not qualified for the current license term are to be refurbished, replaced, or have their qualification extended prior to reaching the aging limits established in the evaluation. Aging evaluations for EQ components that specify a qualification of at least 40 years are considered TLAAs for license renewal. The EQ Program ensures that these EQ components are maintained within the bounds of their qualification bases.

NUREG-1801 Consistency

The Environmental Qualification Program is an existing program, that was established to meet Plant commitments for 10 CFR 50.49. It is consistent with NUREG-1801, Section X.E1, "Environmental Qualification (EQ) of Electric Components" (Reference 3).

Exceptions to NUREG-1801

None.

Enhancements

None.

Operating Experience

The Environmental Qualification Program includes consideration of operating experience to modify qualification bases and conclusions, including qualified life. Compliance with 10 CFR 50.49 provides reasonable assurance that components can perform their intended function(s) during accident conditions after experiencing the effects of inservice aging. Based upon a review of the existing program and operating experience, the continued implementation of the Environmental Qualification Program provides reasonable assurance that the aging effects will be managed and that EQ components will continue to perform their intended function(s) for the period of extended operation.

Conclusion

Based upon a review of the existing program and operating experience, the continued implementation of the Environmental Qualification Program provides reasonable assurance that the aging effects will be managed and that the in-scope EQ components will continue to

perform their intended function(s) for the period of extended operation. The Environmental Qualification Program will also continue to be subject to periodic internal and external assessments to insure its effectiveness and continuous improvement. This result meets the requirements of ~~10 CFR 54.21(c)(iii).~~ 10 CFR 54.21(c)(1)(iii)

B4.0 REFERENCES

1. NUREG-1800, *Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants*, U.S. Nuclear Regulatory Commission, July 2001.

2. 10 CFR 50 Appendix B

3. NUREG-1801, *Generic Aging Lessons Learned (GALL) Report,* U.S. Nuclear Regulatory Commission, July 2001.

4. NRC SER, Sample Plant - Relief Requests RR 1-24 and RR-2-30 RE: Use Of ASME Code, Section XI, 1998 Edition With Addenda Through 2000, November 5, 2001.

Recommendations To Applicants

For

Enhancing NRC License Renewal Application (LRA) Review Efficiency

January, 2003

Introduction

Throughout the fall of 2002, NEI coordinated a nuclear industry effort where the NRC met periodically with representatives for those applicants who were planning to submit License Renewal Applications (LRAs) in 2003 and early 2004. The objective of the effort was to develop a proposed standard License Renewal Application format for Section 2, Section 3 and Appendix B. An example application in the proposed format for those sections was sent to the NRC for review in January of 2003.

During the development of the Standard License Renewal Application (SLRA), a list was assembled documenting recommendations from NRC staff members for making future LRA reviews more efficient. These recommendations are contained within this document. Where appropriate, the recommendations were incorporated into the SLRA. Each incorporated recommendation is identified with its associated SLRA section number, inside of brackets, next to the item within the list.

The items in this document are only recommendations. They are not requirements. An applicant should evaluate the list and incorporate the recommendations that the applicant feels would best serve them during the NRC review of their application.

This document is divided into the following four sections:

- **General** = Items that pertain to the entire application or application process
- **Section 2.0** = Items that pertain only to Section 2.0
- **Section 3.0** = Items that pertain only to Section 3.0
- **Appendix B** = Items that pertain only to Appendix B

General

1. Dialog early with the staff on Fire Protection scoping. This is a complex area and may require additional time/clarification to ~~indoctrinate~~ the reviewer and ~~plant staff.~~ the applicant. (ensure good communication between)
2. If the NUREG-1801 or the SRP specifically identifies information that the applicant should provide, the LRA should have the information.
3. If possible, make a linkage between LRA sections and the FSAR on the LRA CD; and make sure the linkage works in all cases. This will significantly improve the efficiency of the referencing process.
4. If possible, provide the LRA table of contents ~60 days prior to LRA submittal. This would help the staff align its resources and prepare for the LRA submittal.

5. If possible, provide the staff with a list of the Aging Management Programs (AMPs) credited for License Renewal, along with a distribution table that indicates where each program is used (e.g., RCS, ESF, Auxiliary Systems, etc.) ~60 days prior to LRA submittal. This would help the staff align its resources and prepare for the LRA submittal.

Section 2.0

1. Address the License Renewal ISGs, and the applicant's approach to each, in the LRA. [Section 2.1.X – Interim Staff Guidance Discussion]

2. The system description section of the LRA should contain sufficient detail for the staff to use it in the section of the Safety Evaluation Report (SER) that discusses the technical information in the LRA. [Section 2.3.2.1 – System Description]

3. In the Chapter 2 System Descriptions, the staff would like to see a discussion of the system intended function (i.e., why is the system is in scope for License Renewal). This is especially important for Auxiliary systems where it isn't always clear from the FSAR description why the system is within the scope of License Renewal. [Section 2.3.2.1 – System Description]

4. Make sure the system descriptions have clarity with respect to system boundaries. If the reason for the system boundary identified on the LRA print is not readily apparent, then the LRA should describe the reason for the system boundary (e.g., the portions of this system containing components subject to an AMR, extend from _____ to _____). Make sure boundary descriptions link back to system intended functions. [Section 2.3.2.1 – System Description]

5. System "realignment" occurs when:

    a. A system is defined by the applicant as out of scope for License Renewal, but components get put back in scope due to 10 CFR 54.4 (a)(2).

    b. Components have a system designation of one system, but since they have no License Renewal intended function in that system, the system is listed as out of scope; and the components of interest are listed as in-scope for the system they support.

    If system boundaries are realigned, the reason for the realignment, and an explanation of how it was accomplished, needs to be clearly stated in the LRA.

6. Identify all FSAR references in Section 2, not just one reference location. For several cases in the past, only one FSAR reference has been given in LRA Section 2, when the information actually exists in several sections of the FSAR; and staff reviewers have had to hunt down the additional information. This can be quite time consuming.

7. Do a consistency check between systems listed in the FSAR and those listed in the LRA. The staff has been finding some systems in the FSAR that weren't listed in the LRA.

8. Add a short sentence that indicates that the AMR results are shown in the corresponding Section 3 table and add a hyperlink, if possible. [Section 2.3.2.1 – Components Subject to AMR]

9. Add a table that describes the component intended functions. [Table 2.1-1]

Section 3.0

1. Section 3.0 should contain a description of the two table types and how they work together. [Section 3.0 – Table Description]

2. Make it clear that Table 3.x-1 is essentially the NUREG-1801, Volume 1, table with the addition of an "Item Number" column and a "Discussion" column. Note that the "Item Number" column allows the reviewer to align the Table 3.x-1 row with the corresponding NUREG-1801, Volume 1 table row to check consistency; and allows cross-referencing from Table 3.x.2-y. [Section 3.0 – Table 1 description]

3. Change the Section 3.2.1 title from "Scope" to "Introduction." [Section 3.2.1]

4. Make sure that corresponding columns in the Section 3 tables use the same terminology/labels. [Table 3.2.1 and Table 3.2.2-1]

5. In Section 3 of the application, add a summary description of the materials, environments, aging effects requiring management and aging management programs used for each system, structure group and electrical commodity group, that can be used in writing the Safety Evaluation Report (SER). Since the reviewer needs this information to develop the SER, it would most likely be more cost effective for the applicant to provide this description, than it would be for the reviewer to develop it. Additionally, the applicant may be able to develop a program that "automatically" assembles this information for inclusion in the LRA, making the effort even more cost effective. [Section 3.2.2.1]

Table 3.x-1

1. Add an LRA subsection reference to the applicable paragraphs in the "Discussion" column for those items where further evaluation is recommended. [Table 3.2.1]

2. Add all NUREG-1801, Volume 1 Row numbers for accounting. For those rows that are not applicable because of plant design, just add "BWR(PWR) Only" [Table 3.2.1]

3. If a plant specific program is designated in table 3.x-1, identify the program and its detailed description and justification location in the LRA (and add a hyperlink if possible). [Table 3.2.1]

4. When NUREG-1801, Volume 1 lists "Plant Specific" for a program, if all other items in that particular row in Table 3.x-1 are consistent with NUREG-1801, the entire row can be considered to be consistent with NUREG-1801. However, in the Table 3.x-1 "Discussion" column, the applicant must identify the program or programs being used to satisfy that NUREG-1801 line item. [Table 3.2.1]

5. If the words "Not Applicable" are used in the "Discussion" column, make it very clear what "Not Applicable" means. [Table 3.2.1]

Table 3.x.2-y

1. The use of Intended Functions abbreviations in Table 3.x.2-y is permissible (and even preferable) as long as the abbreviations are defined in the Intended Functions tables of Section 2. [Table 3.2.2-1 and Table 2.0-1]

2. For the standard LRA format, the Class of '03 should develop several examples of standard notes to be used that amplify whether a table row is consistent with NUREG-1801 or consistent w/exceptions, or plant-specific. The industry standard notes should be designated by a letter and the plant specific notes should be designated by a number; since it is anticipated that there will be many more plant specific notes than industry standard notes. [Table 3.2.2-1 – "Notes for Tables 3.2.2-1 through 3.2.2-X" immediately following Table 3.2.2-X]

3. The title of column #6, "GALL Item," should be changed to "NUREG-1801, Volume 2 Item" to be consistent with the Class of '03 recommendation to refer to GALL, within the application, as NUREG-1801. [Table 3.2.2-1]

Appendix B

1. Be cautioned that NUREG-1801 program X.M1, "Metal Fatigue of Reactor Coolant Pressure Boundary," is intended to address environmentally-assisted fatigue, not other aspects of fatigue monitoring. Also, be advised that NUREG-1801 program XI.M19, "Steam Generator Tube Integrity," addresses steam generator tubes only, not other SG components.

2. NUREG-1801 AMP XI.M27, "Fire Water System," states that the AMP applies to underground piping, among other components. However, nowhere in the remainder of the NUREG-1801 description does it discuss how to manage the effects of aging on underground piping. This needs to be addressed.

3. If exceptions are taken to generic communications that are referenced in the NUREG-1801 AMPs, note this in the LRA and provide justification for why the plant AMP is still consistent with the NUREG-1801 AMP.

4. If credit is being taken for a Topical Report, make sure the topical report is applicable for 60 years.

5. Applicant Action Items of referenced WCAPs need to be addressed in the LRA.

6. Consider identifying, in a list, which programs are currently existing and which programs are new. [Section B1.5]

7. Each exception to NUREG-1801 should be clearly defined, explained, and justified. [Section B2.1.1]

8. State why exceptions to the NUREG-1801 program are necessary for the plant and include in which program element(s) the exceptions are reflected. Be sure to identify the exceptions within the actual program element descriptions. [Section B2.1.1]

9. State why enhancements to the NUREG-1801 program are necessary for the plant and include in which program element(s) the enhancements are reflected. Be sure to identify the enhancements within the actual program element descriptions. [Section B2.1.1]

10. Modify the title of Section B3.0 to say, "TLAA Evaluation of Aging Management Programs Under 10 CFR 54.2(c)(1)(iii)." "TLAA Support Activities" is not an accurate characterization of this section. [Section B3.0]