3. AGING MANAGEMENT REVIEW RESULTS

This Section of the SER contains the staff's evaluation of the applicant's aging management programs (AMPs) and aging management reviews (AMRs). In Appendix B of the LRA, the applicant described the 33 AMPs that it relies on to manage or monitor the aging of long-lived, passive components and structures. In Section 3 of the LRA, the applicant provided the results of the AMRs for those structures and components that were identified in Section 2 of the LRA as being within the scope of license renewal and subject to an AMR.

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

In preparing its license renewal application (LRA), Entergy Operations, Inc. (Entergy, the applicant) credited NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," dated July 2001. The GALL Report contains the staff's generic evaluation of the existing plant programs and 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 GALL Report indicate that many of the existing programs are adequate to manage the aging effects for particular structures or components for license renewal without change. The GALL Report also contains recommendations on specific areas for which existing programs should be augmented for license renewal. An applicant may reference the GALL Report in its LRA to demonstrate that the programs at its facility correspond to those reviewed and approved in the report.

The purpose of the GALL Report is to provide the staff with a summary of staff-approved AMPs to manage or monitor the aging of structures and components that are subject to an AMR. If an applicant commits to implementing these staff-approved AMPs, the time, effort, and resources used to review an applicant's LRA will be greatly reduced, thereby improving the efficiency and effectiveness of the license renewal review process. The GALL Report also serves as a reference for applicants and staff reviewers to quickly identify those AMPs and activities that the staff has determined will adequately manage or monitor aging during the period of extended operation.

The GALL Report identifies (1) systems, structures, and components (SSCs), (2) structure and component (SC) materials, (3) the environments to which the SCs are exposed, (4) the aging effects associated with the materials and environments, (5) the AMPs that are credited with managing or monitoring the aging effects, and (6) recommendations for further applicant evaluations of aging management for certain component types.

To determine whether using the GALL Report would improve the efficiency of the license renewal review, the staff conducted a demonstration project to exercise the GALL process and to determine the format and content of a safety evaluation based on this process. The results of the demonstration project confirmed that the GALL process will improve the efficiency and effectiveness of the LRA review while maintaining the staff's focus on public health and safety. NUREG-1800, "Standard Review Plan for the Review of License Renewal Applications," dated April 2001 (SRP-LR), was prepared based on both the GALL Report model and lessons learned from the demonstration project.

The staff performed its work in accordance with the requirements of Title 10 of the *Code of*

Federal Regulations, Part 54 (10 CFR 54), "Requirements for Renewal of Operating Licenses for Nuclear Power Plants;" the guidance provided in NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants" (SRP-LR), dated July 2001; the guidance provided in NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," dated July 2001; and the "Audit and Review Plan for Plant Aging Management Reviews and Programs - Arkansas Nuclear One, Unit 2."

The staff performed audits and technical reviews of the license renewal applicant's AMPs and AMRs. These audits and reviews are to verify that the effects of aging on structures and components will be adequately managed so that their intended functions will be maintained consistently with the plant's current licensing basis (CLB) for the period of extended operation as required by 10 CFR 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants."

Overall, the staff verified that the applicant's aging management activities and programs will adequately manage the effects of aging on structures and components, so that their intended functions will be maintained consistent with the current licensing basis (CLB) for the period of extended operation.

During its review of the Arkansas Nuclear One, Unit 2 (ANO-2) LRA, the staff performed on-site audits and reviews during the weeks of December 1, 2003, and February 9, 2004, to verify that AMP and AMR results that the applicant claimed were consistent with the GALL Report were actually consistent as claimed.

The on-site audit and review is designed to maximize the efficiencies of the staff's review of the LRA. By performing on-site audits and reviews, it precludes the need for formal correspondence between staff and the applicant and therefore, improves efficiency of the review of the LRA. Questions from the staff can be responsed to quickly by the applicant's technical's staff and on-site verification can be performed.

Details of the staff's evaluation of the audit and review are documented in the "Audit and Review Report for Plant Aging Management Reviews - Arkansas Nuclear One, Unit 2 ," dated July 29, 2004 (audit and review report).

3.0.1 Format of the Licence Renewal Application

Entergy Operations, Inc. (Entergy, the applicant) submitted an application that followed the standard LRA format, as agreed to between the NRC staff and the Nuclear Energy Institute (NEI) (see letter dated April 7, 2003). This revised LRA format incorporates lessons learned from the staff's reviews of the previous five LRAs. These previous applications used a format developed from information gained during an NRC staff and NEI demonstration project conducted to evaluate the use of the GALL Report in the staff's review process.

The organization of Section 3 of the LRA parallels Chapter 3 of the SRP-LR. The AMR results information in Section 3 of the LRA is presented in the following two table types.

- Table 1: Table 3.x.1 - where "3" indicates the LRA section number, "x" indicates the subsection number from the GALL Report, and "1" indicates that this is the first table

type in Section 3 of the LRA.

- Table 2: Table 3.x.2-y - where "3" indicates the LRA section number, "x" indicates the subsection number of the GALL Report, "2" indicates that this is the second table type in Section 3 of the LRA, and "y" indicates the system table number.

The content of the previous applications and the ANO-2 application is essentially the same. The intent of the revised format used for the ANO-2 application was to modify the tables in Chapter 3 to provide additional information to assist the staff in its review. In Table 1 the applicant summarized the portions of the application it considered to be consistent with the GALL Report. In Table 2, the applicant identified the linkage between the scoping and screening results in Chapter 2 and the AMRs in Chapter 3.

3.0.1.1 Overview of Table 1

Table 3.x.1 (Table 1) provides a summary comparison of how the facility aligns with the corresponding tables of the GALL Report, Volume 1. The table is essentially the same as Tables 1 through 6 provided in the GALL Report, 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
- The name of a plant-specific program being used
- Exceptions to the GALL Report assumptions
- A discussion of how the line is consistent with the corresponding line item in the GALL Report when that may not be intuitively obvious
- A discussion of how the item is different than the corresponding line item in the GALL Report (e.g., when there is exception taken to an aging management program that is listed in the GALL Report)

The format of Table 1 allows the staff to align a specific Table 1 row with the corresponding NUREG-1801, Volume 1, table row so that consistency can be checked easily.

3.0.1.2 Overview of Table 2

Table 2 provides the detailed results of the AMRs for those components identified in LRA Section 2 as being subject to an AMR. The LRA contains a Table 2 for each of the components or systems within a system grouping (e.g., reactor coolant systems, engineered safety features, auxiliary systems, etc.). For example, the engineered safety features group contains tables specific to the containment spray system, containment isolation system, and emergency core cooling system, Table 2 consists of the following nine columns:

Component Type - The first column identifies 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 - The fifth column lists aging effects requiring management. As part of the aging management review process, the applicant determined any aging effects requiring management for each material and environment combination.

Aging Management Programs - The sixth column lists the aging management programs the applicant used to manage the identified aging effects.

GALL Vol. 2 Item - The seventh column lists the GALL Report item(s) that the applicant identified as being similar to the AMR results in its LRA. The applicant compared each combination of component type, material, environment, aging effect requiring management, and aging management program in Table 2 of the SER to the items in the GALL Report. If there were no corresponding item in the GALL Report, the applicant left the column blank. In this way, the applicant identified the AMR results in the LRA tables that corresponded to items in the GALL Report tables.

Table 1 Item - The eighth column lists the corresponding summary item number from Table 1. If the applicant identifies AMR results in Table 2 that are consistent with the GALL Report, then the associated Table 3.x.1 line summary item number should be listed in Table 2. If there is no corresponding item in the GALL Report, then column eight is left blank. That way, the information from the two tables can be correlated.

Notes - The ninth column lists the corresponding notes that the applicant used to identify how the information in Table 2 aligns with the information in the GALL Report. The notes identified by letters were developed by a Nuclear Energy Institute working group and will be used in future license renewal applications. Any plant-specific notes are identified by a number and provide additional information concerning the consistency of the line item with the GALL Report.

3.0.2 Staff's Review Process

The staff evaluated each row in Table 1 by moving from left to right across the table. Since the applicant reproduced the component, aging effect/mechanism, aging management programs and further evaluation recommended information from the SRP-LR, no further staff review of those columns is required. The staff reviewed information provided by the applicant in the

Discussion column or other sections of the LRA to determine whether the applicant's AMR results and AMPs were consistent with the AMRs and AMP items in the GALL Report.

The staff conducted the following three types of evaluations of the AMRs and associated AMPs.

- For items the applicant stated were consistent with the GALL Report, the staff conducted an audit.

- For items the applicant stated were consistent with the GALL Report with exceptions, the staff conducted an audit and review of the item and of the applicant's technical justification for the exceptions.

- For other items, the staff conducted a technical review.

3.0.2.1 Review of AMPs

For those AMPs for which the applicant claimed consistency with the GALL AMPs, the staff conducted an audit to verify that the applicant's AMPs were consistent with the AMPs in the GALL Report.

For each AMP that had one or more deviations, the staff evaluated each deviation to determine (1) whether the deviation was acceptable, and (2) whether the AMP, as modified, would adequately manage the aging effect(s) for which it was credited.

For each AMP that was not evaluated in the GALL Report, the staff performed a full review to determine the adequacy of the AMP. The staff evaluated the AMP against the following 10 program elements defined in SRP-LR Appendix A.

1. Scope of program - Scope of the program should include the specific structures and components subject to an AMR for license renewal.

2. Preventive actions - Preventive actions should prevent or mitigate aging degradation.

3. Parameters monitored or inspected - Parameters monitored or inspected should be linked to the degradation of the particular structure or component intended functions(s).

4. Detection of aging effects - Detection of aging effects should occur before there is a loss of structure or component intended functions(s). This includes aspects such as method or technique (i.e., visual, volumetric, surface inspection), frequency, sample size, data collection and timing of new/one-time inspections to ensure timely detection of aging effects.

5. Monitoring and trending - Monitoring and trending should provide predictability of the extent of degradation, and timely corrective or mitigative actions.

6. Acceptance criteria - Acceptance criteria, against which the need for corrective action will be evaluated, should ensure that the structure or component intended function(s) are maintained under all CLB design conditions during the period of extended operation.

7. Corrective actions - Corrective actions, including root cause determination and prevention of recurrence, should be timely.

8. Confirmation process - Confirmation process should ensure that preventive actions are adequate and that appropriate corrective actions have been completed and are effective.

9. Administrative controls - Administrative controls should provide a formal review and approval process.

10. Operating experience - Operating experience of the aging management program, including past corrective actions resulting in program enhancements or additional programs, should provide objective evidence to support the conclusion that the effects of aging will be managed adequately so that the structure and component intended function(s) will be maintained during the period of extended operation.

The staff reviewed the applicant's corrective action program and documented its findings in Section 3.0.3 of this SER. The staff's evaluation of the corrective action program included assessment of the corrective actions, confirmation process, and administrative controls program elements. Consequently, the staff's documentation of its review of AMPs not consistent with the GALL Report AMPs only addresses 7 of the 10 program elements.

The staff reviewed the information concerning the operating experience program element for the AMPs that are consistent with GALL Report AMPs. Details of the staff's evaluation of the audit and review are documented in the audit and review report.

The staff reviewed the Updated Final Safety Analysis Report (UFSAR) supplement for each AMP to determine if it provided an adequate description of the program or activity, as required by 10 CFR 54.21(d).

3.0.2.2 Review of AMR Results

Table 2 of the LRA contains information concerning whether or not the AMRs align with the AMRs identified in the GALL Report. For a given AMR in Table 2, the staff reviewed the intended function, material, environment, aging effect requiring management and aging management program combination for a particular component type within a system. The AMRs that correlate between a combination in Table 2 and a combination in the GALL Report were identified by a referenced item number in column seven, "GALL, Volume 2 Item." The staff conducted an audit to verify the correlation. A blank column seven indicates that the applicant was unable to locate an appropriate corresponding combination in the GALL Report. The staff conducted a technical review of these combinations that were not consistent with the GALL Report. The next column, "Table 1 Item," provided a reference number that indicated the corresponding row in Table 1.

3.0.2.3 NRC-Approved Precedents

To help facilitate the staff review of the LRA, an applicant may reference NRC-approved precedents to demonstrate that its non-GALL programs correspond to programs that the staff had approved for other plants during its review of previous applications for license renewal.

When an applicant elects to provide precedent information, the staff determines whether the material presented in the precedent is applicable to the applicant's facility, determines whether the plant program is bounded by the conditions for which the precedent was evaluated and approved, and verifies that the plant program contains the program elements (or attributes) of the referenced precedent. In general, if the staff determines that these conditions are satisfied, it will use the information in the precedent to frame and focus its review of the applicant's program.

It is important to note that precedent information is not a part of the LRA; it is supplementary information voluntarily provided by the applicant as a reviewer's aid. The existence of a precedent, in and of itself, is not a sufficient basis to accept the applicant's program. Rather, the precedent facilitates the review of the substance of the matters described in the applicant's program. As such, in its documentation of its reviews of programs that are based on precedents, the precedent information is typically implicit in the evaluation rather than explicit. If the staff determines that a precedent identified by the applicant is not applicable to the particular plant program for which it is credited, it refers the program to the NRR, Division of Engineering (DE) for review in the traditional manner, i.e., as described in the SRP-LR, without consideration of the precedent information. The applicant chose to provide precedent information to support its selection of certain programs. Therefore, some of the staff reviews documented in this SER considered precedent information in the manner described above.

3.0.2.4 UFSAR Supplement

Consistent with the SRP-LR, for the AMRs and associated AMPs that it reviewed, the staff also reviewed the UFSAR supplement that summarizes the applicant's programs and activities for managing the effects of aging for the period of extended operation.

3.0.2.5 Documentation and Documents Reviewed

In performing its work, the staff relied heavily on the LRA, the SRP-LR, and the GALL Report. The staff also examined the applicant's precedent review documents and AMP basis documents (a catalog of the documentation used by the applicant to develop or justify its AMPs), and other applicant documents, including selected implementing procedures, to verify that the applicant's activities and programs will adequately manage the effects of aging on SCs.

Any discrepancies or issues discovered during the audit and review that required a formal response on the docket are documented in the staff's audit and review report. If an issue was not docketed or was not resolved prior to issuing this report, a request for additional information (RAI) was prepared by the staff describing the issue and the information needed to disposition the issue. The RAI, if needed, is included and dispositioned in this ANO-2 SER related to the LRA. The list of RAIs associated with the audit and review is provided in Attachment 3 to the staff's audit and review report.

A list of documents reviewed by the staff is listed as Attachment 4 to the staff's audit and review report. During its site visits, the staff also conducted detailed discussions and interviews with the applicant's license renewal project personnel and others with technical expertise relevant to aging management.

3.0.3 Aging Management Programs

Table 3.0.3-1 presents the AMPs credited by the applicant and described in Appendix B of the LRA. The table also indicates the GALL program that the applicant claimed its AMP was consistent with (if applicable) and the systems, structures, or components that credit the program for managing or monitoring aging. The section of the safety evaluation report in which the staff's evaluation of the program is documented also is provided.

Table 3.0.3-1
ANO-2's Aging Management Programs

ANO-2's AMP (LRA Section)	GALL Comparison	GALL AMP(s)	LRA Systems or Structures that Credit the AMP	Staff's SER Section
Existing AMPs				
Bolting and Torquing Activities Program (B.1.2)	Plant-specific	N/A	Reactor Vessel, Internals, and Reactor Coolant System; Engineered Safety Features Systems; Auxiliary Systems; Steam and Power Conversion Systems	3.0.3.3.2
Boric Acid Corrosion Prevention Program (B.1.3)	Consistent with enhancements	XI.M10	Reactor Vessel, Internals, and Reactor Coolant System; Engineered Safety Features Systems; Auxiliary Systems; Structures and Component Supports; Electrical and Instrumentation and Controls	3.0.3.2.1
Containment Leak Rate Program (B.1.6)	Consistent	XI.S4	Engineered Safety Features Systems; Structures and Component Supports	3.0.3.1
Diesel Fuel Monitoring Program (B.1.7)	Consistent with exceptions	XI.M30	Auxiliary Systems	3.0.3.2.3
Environmental Qualification (EQ) of Electric Components Program (B.1.8)	Consistent	X.E1	Electrical and Instrumentation and Controls	3.0.3.1
Fatigue Monitoring Program (B.1.9)	Consistent with exceptions	X.M1	Reactor Vessel, Internals, and Reactor Coolant System	3.0.3.2.4
Fire Protection Program (B.1.10.1)	Consistent with exceptions	XI.M26	Auxiliary Systems; Structures and Component Supports	3.0.3.2.5
Fire Water System Program (B.1.10.2)	Consistent with one exception; one enhancement	XI.M27	Auxiliary Systems; Structures and Component Supports	3.0.3.2.5

ANO-2's AMP (LRA Section)	GALL Comparison	GALL AMP(s)	LRA Systems or Structures that Credit the AMP	Staff's SER Section
Flow-Accelerated Corrosion Program (B.1.11)	Consistent	XI.M17	Reactor Vessel, Internals, and Reactor Coolant System; Engineered Safety Features Systems; Auxiliary Systems; Steam and Power Conversion Systems	3.0.3.1
Inservice Inspection – Containment Inservice Inspection (CII) Program (B.1.13)	Plant-specific	N/A	Structures and Component Supports	3.0.3.3.4
Inservice Inspection – Inservice Inspection (ISI) Program (B.1.14)	Plant-specific	N/A	Reactor Vessel, Internals, and Reactor Coolant System; Structures and Component Supports	3.0.3.3.5
Oil Analysis Program (B.1.17)	Plant-specific	N/A	Auxiliary Systems; Steam and Power Conversion Systems	3.0.3.3.6
Periodic Surveillance and Preventive Maintenance Program (B.1.18)	Plant-specific	N/A	Engineered Safety Features Systems; Auxiliary Systems; Steam and Power Conversion Systems; Structures and Component Supports	3.0.3.3.7
Pressurizer Examinations Program (B.1.19)	Plant-specific	N/A	Reactor Vessel, Internals, and Reactor Coolant System	3.0.3.3.8
Reactor Vessel Head Penetration Program (B.1.20)	Consistent	XI.M11	Reactor Vessel, Internals, and Reactor Coolant System	3.0.3.1
Reactor Vessel Integrity Program (B.1.21)	Consistent with enhancement	XI.M31	Reactor Vessel, Internals, and Reactor Coolant System	3.0.3.2.6
Service Water Integrity Program (B.1.24)	Consistent with exceptions/ enhancement	XI.M20	Engineered Safety Features Systems; Auxiliary Systems; Structures and Component Supports	3.0.3.2.7
Steam Generator Integrity Program (B.1.25)	Consistent	XI.M19	Reactor Vessel, Internals, and Reactor Coolant System	3.0.3.1
Structures Monitoring – Masonry Wall Program (B.1.26)	Consistent	XI.S5	Structures and Component Supports	3.0.3.1
Structures Monitoring – Structures Monitoring Program (B.1.27)	Consistent	XI.S6	Structures and Component Supports	3.0.3.1

ANO-2's AMP (LRA Section)	GALL Comparison	GALL AMP(s)	LRA Systems or Structures that Credit the AMP	Staff's SER Section
System Walkdown Program (B.1.28)	Plant-specific	N/A	Reactor Vessel, Internals, and Reactor Coolant System; Engineered Safety Features Systems; Auxiliary Systems; Steam and Power Conversion Systems	3.0.3.3.9
Water Chemistry Control – Auxiliary Systems Water Chemistry Control Program (B.1.30.1)	Plant-specific	N/A	Auxiliary Systems; Steam and Power Conversion Systems	3.0.3.3.11
Water Chemistry Control – Closed Cooling Water Chemistry Control Program (B.1.30.2)	Consistent with exceptions	XI.M21	Reactor Vessel, Internals, and Reactor Coolant System; Auxiliary Systems; Steam and Power Conversion Systems; Structures and Component Supports	3.0.3.2.8
Water Chemistry Control – Primary and Secondary Water Chemistry Control Program (B.1.30.3)	Consistent	XI.M2	Reactor Vessel, Internals, and Reactor Coolant System; Engineered Safety Features Systems; Auxiliary Systems; Steam and Power Conversion Systems; Structures and Component Supports	3.0.3.1
New AMPs				
Alloy 600 Aging Management Program (B.1.1)	Plant-specific	N/A	Reactor Vessel, Internals, and Reactor Coolant System	3.0.3.3.1
Buried Piping Inspection Program (B.1.4)	Consistent with exceptions	XI.M34	Auxiliary Systems	3.0.3.2.2
Cast Austenitic Stainless Steel (CASS) Evaluation Program (B.1.5)	Consistent	XI.M12	Reactor Vessel, Internals, and Reactor Coolant System	3.0.3.1
Heat Exchanger Monitoring Program (B.1.12)	Plant-specific	N/A	Engineered Safety Features Systems; Auxiliary Systems	3.0.3.3.3
Non-EQ Inaccessible Medium-Voltage Cable Program (B.1.15)	Consistent	XI.E3	Electrical and Instrumentation and Controls	3.0.3.1
Non-EQ Insulated Cables and Connections Program (B.1.16)	Consistent	XI.E1	Electrical and Instrumentation and Controls	3.0.3.1

ANO-2's AMP (LRA Section)	GALL Comparison	GALL AMP(s)	LRA Systems or Structures that Credit the AMP	Staff's SER Section
Reactor Vessel Internals Cast Austenitic Stainless Steel Components Program (B.1.22)	Consistent	XI.M3	Reactor Vessel, Internals, and Reactor Coolant System	3.0.3.1
Reactor Vessel Internals Stainless Steel Plates, Forgings, Welds, and Bolting Program (B.1.23)	Consistent	XI.M16	Reactor Vessel, Internals, and Reactor Coolant System	3.0.3.1
Wall Thinning Monitoring Program (B.1.29)	Plant-specific	N/A	Auxiliary Systems	3.0.3.3.10

3.0.3.1 AMPs that are Consistent with the GALL Report

In Appendix B of the LRA, the applicant indicated that the following AMPs were consistent with the GALL Report:

- Cast Austenitic Stainless Steel (CASS) Evaluation Program (B.1.5)
- Containment Leak Rate Program (B.1.6)
- Environmental Qualification (EQ) of Electric Components Program (B.1.8)
- Flow-Accelerated Corrosion Program (B.1.11)
- Non-EQ Inaccessible Medium-Voltage Cable Program (B.1.15)
- Non-EQ Insulated Cables and Connections Program (B.1.16)
- Reactor Vessel Head Penetration Program (B.1.20)
- Reactor Vessel Internals Cast Austenitic Stainless Steel Components Program (B.1.22)
- Reactor Vessel Internals Stainless Steel Plates, Forgings, Welds, and Bolting Program (B.1.23)
- Steam Generator Integrity Program (B.1.25)
- Structures Monitoring – Masonry Wall Program (B.1.26)
- Structures Monitoring – Structures Monitoring Program (B.1.27)
- Water Chemistry Control – Primary and Secondary Water Chemistry Control Program (B.1.30.3)

During an audit that was conducted by the staff on December 1-5, 2003, the staff reviewed selected documents and procedures associated with the AMPs that are listed above. The staff confirmed the applicant's claim of consistency. Details of the staff's evaluation of the audit and review are documented in the audit and review report. The staff determined that these AMPs are consistent with the AMPs described in the GALL Report, including the associated operating experience attribute.

In Appendix A of the LRA, the applicant provided the Updated Final Safety Analysis Report (UFSAR) supplement required by 10 CFR 54.21(d). The applicant will incorporate the information presented in Appendix A into the UFSAR as Chapter 18 following the issuance of

the renewed operating licenses. The staff reviewed the information in Appendix A and verified that the information in the UFSAR supplement provides an adequate summary of the program activities. The staff reviewed the following sections of Appendix A of the LRA.

- Section A.2.1.5 of the LRA for the Cast Austenitic Stainless Steel (CASS) Evaluation Program
- Section A.2.1.6 of the LRA for the Containment Leak Rate Program
- Section A.2.1.8 of the LRA for the Environmental Qualification (EQ) of Electric Components Program
- Section A.2.1.12 of the LRA for the Flow-Accelerated Corrosion Program
- Section A.2.1.16 of the LRA for the Non-EQ Inaccessible Medium-Voltage Cable Program
- Section A.2.1.17 of the LRA for the Non-EQ Insulated Cables and Connections Program
- Section A.2.1.21 of the LRA for the Reactor Vessel Head Penetration Program
- Section A.2.1.23 of the LRA for the Reactor Vessel Internals Cast Austenitic Stainless Steel Components Program
- Section A.2.1.24 of the LRA for the Reactor Vessel Internals Stainless Steel Plates, Forgings, Welds, and Bolting Program
- Section A.2.1.26 of the LRA for the Steam Generator Integrity Program
- Section A.2.1.27 of the LRA for the Structures Monitoring – Masonry Wall Program
- Section A.2.1.28 of the LRA for the Structures Monitoring – Structures Monitoring Program
- Section A.2.1.33 of the LRA for the Water Chemistry Control – Primary and Secondary Water Chemistry Control Program

The staff reviewed these sections and verified that the information in the UFSAR supplements provides an adequate summary of the program activities. The staff finds these sections of the UFSAR supplements sufficient.

On the basis of its audit, the staff finds that those programs for which the applicant claimed consistency with the GALL Report are consistent with the AMPs described in the GALL Report. Details of the staff's evaluation of the audit and review are documented in the audit and review report.

The staff concludes that for the AMPs listed above, the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by

10 CFR 54.21(a)(3). The staff reviewed the associated UFSAR supplements for these AMPs and concludes that the UFSAR supplements provide an adequate summary description of the programs, as required by 10 CFR 54.21(d).

3.0.3.2 AMPs that are Consistent with the GALL Report with Exceptions and/or Enhancements

In Appendix B of the LRA, the applicant indicated that the following AMPs were consistent with the GALL Report with exceptions and/or enhancement.

- Boric Acid Corrosion Prevention Program (B.1.3)
- Buried Piping Inspection Program (B.1.4)
- Diesel Fuel Monitoring Program (B.1.7)
- Fatigue Monitoring Program (B.1.9)
- Fire Protection Program (B.1.10.1 and B.1.10.2)
- Reactor Vessel Integrity Program (B.1.21)
- Service Water Integrity Program (B.1.24)
- Water Chemistry Control - Closed Cooling Water Chemistry Control Program (B.1.30.2)

For AMPs that the applicant claimed are consistent with the GALL Report with exceptions and/or enhancement, the staff performed an audit to verify that those elements or features of the program for which the applicant claimed consistency with the GALL Report were indeed consistent. Furthermore, the staff reviewed the exceptions and/or enhancement and its justification to determine whether the AMP, with the exceptions and/or enhancement, remains adequate to manage the aging effects for which it is credited. Details of the staff's evaluation of the audit and review are documented in the audit and review report. The staff also reviewed the exceptions and/or enhancements to the GALL Report to determine whether they were acceptable. The results of the staff's audit and review are documented in the following sections of this SER.

3.0.3.2.1 Boric Acid Corrosion Prevention Program

Summary of Technical Information

<TO BE PROVIDED BY - DE >

Staff Evaluation

< DE to insert staff evaluation of enhancements>
Operating Experience

< DE to insert operating experience >

UFSAR Supplement

< DE to insert UFSAR Supplement Review >

Conclusions

< DE to insert Conclusions>

3.0.3.2.2 Buried Piping Inspection

Summary of Technical Information in the Application

The applicant's buried piping inspection program is described in LRA Section B.1.4, "Buried Piping Inspection." In the LRA, the applicant stated that this is a new program that will be initiated prior to the period of extended operation. This program will be consistent, with exceptions, with GALL AMP XI.M34, "Buried Piping and Tanks Inspection." This AMP is credited with preventive measures to mitigate corrosion and with inspections to manage the effects of corrosion on the pressure-retaining capability of buried carbon steel components.

Staff Evaluation

During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's evaluation of the audit and review are documented in the audit and review report. Furthermore, the staff reviewed the exceptions and their justifications to determine whether the AMP, with the exceptions, remains adequate to manage the aging effects for which it is credited.

In Appendix B, Section B.1.4, of the LRA, the applicant stated that the buried piping inspection program will include (a) preventive measures to mitigate corrosion and (b) inspections to manage the effects of corrosion on the pressure-retaining capability of buried carbon steel components. Preventive measures will be in accordance with standard industry practice for maintaining external coatings and wrappings. Buried components will be inspected when excavated during maintenance. With the following exceptions, which will be initiated prior to the period of extended operation, the applicant stated that the buried piping inspection program will be consistent with GALL AMP XI.M34:

Element: 1: Scope of Program
Exception: (1) Buried valves and bolting that are not included in the GALL AMP will be inspected as part of this AMP.
(2) Tanks will not be inspected.

Element: 4: Detection of Aging Effects
Exception: Buried components will be inspected only when excavated during maintenance activities, not based on a scheduled inspection frequency.

In the LRA, the applicant stated the buried piping inspection program will include buried valves and bolting that are not included in the GALL AMP. The applicant stated that the additional components are of the same material, exposed to the same environment, and are expected to have the same aging effects as the other components covered by this AMP. Thus, the effects of aging will be identified prior to loss of intended function regardless of component type. In addition, the applicant stated that are no buried tanks subject to an AMR.

In addition, the buried piping inspection program will require inspections of the buried components only when excavated during maintenance activities, which is inconsistent with the GALL AMP. The applicant stated that excavating such components solely to perform inspections poses undue risk of damage to protective coatings. Operating experience shows that the frequency of excavating buried components for maintenance activities is sufficient to provide reasonable assurance that the effects of aging will be identified prior to loss of intended function.

The staff finds that including the buried valves and bolting within the program scope is acceptable because they are the same material, exposed to the same environment, and are expected to have the same aging effects as the carbon steel piping covered by the buried piping inspection program. Because none of the ANO-2 buried tanks are within the scope of license renewal and subject to an AMR, the staff finds excluding buried tanks for inspection to be acceptable as well.

The GALL Report program description in Section XI.M34 recommends further evaluation of an applicant's operating experience with buried components in determinations of the adequacy of this program element. The staff reviewed the ANO-2 operating experience with excavations over the past few years and, based on the review as well as the applicant's discussion of this exception in the LRA, the staff finds that the frequency of excavating buried components for maintenance activities will be sufficient to provide reasonable assurance that the effects of aging will be identified prior to loss of intended function. Excavating such components solely to perform inspections could pose undue risk of damage to protective coatings. The staff finds that this exception is acceptable.

On the basis of its review of this AMP, the associated engineering report, and the operating experience, the staff determined that the buried piping inspection program is consistent with the GALL Report and that the exceptions in the buried piping inspection program are acceptable.

Operating Experience

The applicant stated that there have been multiple excavations at the site which provide some plant-specific operating experience even though the buried piping inspection program is a new program.

The staff reviewed the documentation for multiple excavations performed at the site for several maintenance activities. These excavations indicate that corrosion has not been a problem.

During the audit, the staff asked the applicant to clarify and/or provide the operating experience reviews for new programs. In its response, the applicant stated that the plant corrective action program, which captures internal and external plant operating experience issues, provides reasonable assurance that operating experience will be reviewed and incorporated in the future to provide objective evidence to support the conclusion that the effects of aging will be adequately managed.

On the basis of its review of the above operating experience and the applicant's response, and on discussions with the applicant's technical staff, the staff concludes that the buried piping inspection program will adequately manage the aging effects that have been observed at the applicant's plant.

UFSAR Supplement

In Appendix A, Section A.2.1.4, of the LRA, the applicant provided the UFSAR supplement for the buried piping inspection program. The staff reviewed this section and verified that the information in the UFSAR supplement provides an adequate summary of the program activities. The staff finds this section of the UFSAR supplement sufficient.

Conclusions

On the basis of its review and audit of the applicant's program, the staff finds that those elements of the program for which the applicant claimed consistency with the GALL Report program are consistent with the GALL Report program. In addition, the staff has reviewed the exceptions to the GALL Report program and finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.3 Diesel Fuel Monitoring

Summary of Technical Information in the Application

The applicant's diesel fuel monitoring program is described in LRA Section B.1.7, "Diesel Fuel Monitoring." In the LRA, the applicant stated that the program is consistent with, but includes exceptions to, GALL AMP XI.M30, "Fuel Oil Chemistry Program." This AMP is credited with ensuring that adequate diesel fuel quality is maintained to prevent plugging of filters, fouling of injectors, and corrosion of the fuel systems.

Staff Evaluation

During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's evaluation of the audit and review are documented in the audit and review report. Furthermore, the staff reviewed the exceptions and their justifications to determine whether the AMP, with the exceptions, remains adequate to manage the aging effects for which it is credited.

In Appendix B, Section B.1.7, of the LRA, the applicant stated the following exceptions to GALL AMP XI.M30:

Element: 2: Preventive Actions
Exception: No additives are used (other than biocide) beyond what the refiner adds during production.

Elements: 3: Parameters Monitored/Inspected
6: Acceptance Criteria
Exceptions: (1) Only American Society for Testing Materials (ASTM) standard D 1796 is used for determination of water and sediment, rather than standards D 1796 and D 2709.

(2) The LRA AMP specifies the method of ASTM standard D 2276 with 0.8 μm filter, instead of the modified ASTM standard D 2276, Method A, with a 3 μm filter.

Element: 4: Detection of Aging Effects
Exception: The program does not include ultrasonic measurements of tank bottoms.

The GALL Report identifies the following criterion for the preventive actions program element associated with the exception taken:

> The quality of fuel oil is maintained by additions of biocides to minimize biological activity, stabilizers to prevent biological breakdown of the diesel fuel, and corrosion inhibitors to mitigate corrosion.

The applicant stated that the #2 diesel fuel used at ANO-2 contains a comprehensive additive package. On the basis of its review of operating experience for the ANO-2 diesel fuel monitoring program (see discussion below), the staff finds this exception to be acceptable.

The GALL Report recommended the following criteria: (1) ASTM standard D 4057 is used for guidance on oil sampling and (2) ASTM standards D 1796 and D 2709 are used for determination of water and sediment contamination in diesel fuel. The staff determined that of the three standards recommended by the GALL Report, only the guidance presented in ASTM standard D 1796 applies to fuel oils with the viscosity of that used at ANO-2, and therefore finds this exception to be acceptable.

The guidance in the GALL Report concerning the use of modified ASTM standard D 2276, Method A, recommends a maximum pore size for determination of particulates. Use of a filter with a smaller pore size would not increase the likelihood that aging effects would go undetected and thus potentially affect the ability of components to perform their intended functions consistent with the CLB during the period of extended operation. The staff finds that the applicant's use of ASTM standard D 2276, which specifies the use of a filter with a smaller 0.8 μm pore size than that recommended in ASTM standard D 2276, Method A, is acceptable since the use of a 0.8 μm filter is more conservative than use of the 3.0 μm filter specified in the GALL Report.

The GALL Report states that corrosion may occur at locations in which contaminants may accumulate, such as a tank bottom, and an ultrasonic thickness measurement of the tank bottom surface ensures that significant degradation is not occurring.

The staff reviewed recent fuel oil operating experience and determined that compliance with diesel fuel oil standards and periodic sampling provide assurance that fuel oil contaminants that cause degradation are below allowable limits. Specifically, the review of recent operating experience did not identify unacceptable levels of water, particulate contamination, or biological fouling in the fuel oil. A review of condition reports did not identify instances of fuel oil system component failures attributed to the condition of the fuel oil. Condition report trending data did not identify a need for improvements to this program. Quarterly assessments are performed to review diesel fuel quality parameters to ensure that acceptance criteria are being met and to identify early indications of problems. In addition, the applicant stated that internal surfaces of tanks that are drained for cleaning are visually inspected for degradation. Based on the above

discussion, the staff finds that the exception to preclude ultrasonic measurements of tank bottoms is acceptable.

On the basis of its review of this AMP, the associated engineering report, and the operating experience, the staff determined that this AMP is consistent with the GALL Report and that the exceptions in the diesel fuel monitoring program are acceptable.

Operating Experience

The staff reviewed the operating experience for the diesel fuel monitoring program. The applicant stated that it had experienced fuel oil related problems in 1986. Significant program improvements were implemented as a result of these events. One of the recommendations addressed the addition of an oxidation inhibitor to stored fuel. This is consistent with the need for adding corrosion inhibitors.

The staff's review of recent operating experience did not identify unacceptable levels of water, particulate contamination, or biological fouling in the fuel oil. A review of condition reports did not identify instances of fuel oil system component failures attributed to the condition of the fuel oil. Condition report trending data did not identify a need for improvements to this program. In addition, the applicant stated that it will perform quarterly assessments to review diesel fuel quality parameters to ensure that acceptance criteria are being met and to identify early indications of problems.

On the basis of its review of the above operating experience and on discussions with the applicant's technical staff, the staff concludes that diesel fuel monitoring program adequately manages the aging effects that have been observed at the applicant's plant.

UFSAR Supplement

In Appendix A, Section A.2.1.7, of the LRA, the applicant provided the UFSAR supplement for the diesel fuel monitoring program. The staff reviewed this section and verified that the information in the UFSAR supplement provides an adequate summary of the program activities. The staff finds this section of the UFSAR supplement sufficient.

Conclusions

On the basis of its review and audit of the applicant's program, the staff finds that those elements of the program for which the applicant claimed consistency with the GALL Report program are consistent with the GALL Report program. In addition, the staff has reviewed the exceptions to the GALL Report program and finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.4 Fatigue Monitoring Program

Summary of Technical Information in the Application

The applicant's fatigue monitoring program is described in LRA Section B.1.9, "Fatigue Monitoring." In the LRA, the applicant stated that the program is consistent with, but includes exceptions to, GALL AMP XI.M1, "Metal Fatigue of Reactor Coolant Pressure Boundary." This AMP is credited with tracking the number of critical thermal and pressure transients for selected reactor coolant system components.

Staff Evaluation

During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's evaluation of the audit and review are documented in the audit and review report. Furthermore, the staff reviewed the exceptions and their justifications to determine whether the AMP, with the exceptions, remains adequate to manage the aging effects for which it is credited.

In Appendix B, Section B.1.9, of the LRA, the applicant stated the following exceptions to GALL AMP XI.M1:

Element: 2: Preventive Actions
Exception: The program only involves tracking the number of transient cycles.

Element: 4: Detection of Aging Effects
Exception: The program does not provide for periodic update of fatigue usage calculations. Corrective actions are initiated only when the number of accumulated cycles approaches the number of component design cycles.

The GALL Report states that maintaining the fatigue usage factor below the design code limit and considering the effect of the reactor water environment will provide adequate margin against fatigue cracking of RCS components due to anticipated cyclic strains.

The effect of the reactor water environment on fatigue is addressed as a TLAA in the LRA, Section 4.3.3.1 (Generic Safety Issue 190). The staff's evaluation of this is addressed in Section 4 of this SER.

The GALL Report states that the program provides for periodic update of the fatigue usage calculations. The applicant stated that updates of fatigue usage calculations, as recommended in the GALL Report, are not necessary unless the number of accumulated fatigue cycles approaches the number of assumed design cycles, and commits to implement corrective actions at that time. This is an alternative method for ensuring that the design code limit is not exceeded.

On the basis of its review of this AMP, the associated engineering report, and the operating experience, the staff determined that this AMP is consistent with the GALL Report and that the exceptions in the fatigue monitoring program are acceptable.

Operating Experience

The staff reviewed operating experience for the fatigue monitoring program. The applicant issues quarterly reports documenting operating history, the total number of critical types of transients, and the design limits. Condition report trending data does not reveal a need for improvements to this program. The number of pressure and temperature transient cycles is monitored and periodically compared with the design cycle count, as required by the program, to ensure that fatigue-sensitive components do not exceed their allowable number of design cycles. Based on the above discussion, the staff finds the exception to preclude the periodic update of fatigue usage calculations and that corrective actions are initiated only when the number of accumulated cycles approaches the number of component design cycles to be acceptable.

On the basis of its review of the above operating experience and on discussions with the applicant's technical staff, the staff concludes that AMP B.1.9 is sufficient to support the management of the aging effects of fatigue that has been monitored and predicted at the applicant's plant.

UFSAR Supplement

In Appendix A, Section A.2.1.9, of the LRA, the applicant provided the UFSAR supplement for the fatigue monitoring program. The staff reviewed this section and verified that the information in the UFSAR supplement provides an adequate summary of the program activities. The staff finds this section of the UFSAR supplement sufficient.

Conclusions

On the basis of its review and audit of the applicant's program, the staff finds that those elements of the program for which the applicant claimed consistency with the GALL program are consistent with the GALL program. In addition, the staff has reviewed the exceptions to the GALL program and finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.5 Fire Protection Program

The applicant's fire protection program is described in LRA Section B.1.10, "Fire Protection." The AMP comprises two programs: Fire Protection and Fire Water System. Each program is discussed below.

3.0.3.2.5.1 Fire Protection

Summary of Technical Information in the Application

The applicant's fire protection is described in LRA Section B.1.10.1, "Fire Protection." In the LRA, the applicant stated that the program is consistent with, but includes exceptions to, GALL program XI.M26, "Fire Protection." This AMP is credited with performing periodic inspections

and functional tests of the fire barriers and a diesel-driven fire pump to ensure that the operability of the fire barriers is maintained and that the fuel supply line can perform the intended function, respectively.

Staff Evaluation

During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's evaluation of the audit and review are documented in the audit and review report. Furthermore, the staff reviewed the exceptions and their justifications to determine whether the AMP, with the exceptions, remains adequate to manage the aging effects for which it is credited.

In Appendix B, Section B.1.10.1, of the LRA, the applicant stated the following exceptions to GALL AMP XI.M26:

Element: 3: Parameters Monitored/Inspected
Exceptions: (1) Fire doors are inspected and clearances checked annually, not bi-monthly.
(2) Function tests of fire doors are performed annually, not daily, weekly, or monthly.

Elements: 1: Scope
3: Parameters Monitored/Inspected
4: Detection of Aging Effects
5: Monitoring and Trending
6: Acceptance Criteria
Exception: This program is not necessary to manage aging effects on halon fire protection system components.

The GALL Report identifies the following criteria for the parameters monitored/inspected program element associated with those exceptions taken:

- Hollow metal fire doors are visually inspected at least once bi-monthly for holes in the skin of the door. Fire door clearances are also checked at least once bi-monthly as part of an inspection program.
- Function tests of fire doors are performed daily, weekly, or monthly (which may be plant-specific) to verify the operability of automatic hold-open, release, closing mechanisms, and latches.

The applicant stated that inspection intervals are determined by engineering evaluation to detect degradation of the fire doors prior to the loss of intended function. Interim Staff Guidance (ISG) 04 revised criteria for the GALL AMP XI.M26 parameters monitored/inspected program element to no longer require fire doors to be visually inspected or function tested on a specific frequency. Rather, the applicant can establish a plant-specific interval to verify the integrity of door surfaces and for clearances, with plant-specific inspection intervals to be determined by engineering evaluation to detect degradation of the fire doors. The applicant's program meets ISG-04. Therefore, the staff finds this exception to be acceptable.

The GALL Report identifies the following criteria for program elements: scope, parameters

monitored/inspected, detection of aging effects, monitoring and trending, and acceptance criteria. These criteria are associated with the exception that the fire protection program is not necessary to manage the aging effects on halon fire protection system components:

(1) The scope of this program includes the management of the aging effects on the intended function of the halon/carbon dioxide fire suppression system.
(2) Periodic visual inspection and function tests are to be performed at least once every six months to examine the signs of degradation of the halon/carbon dioxide fire suppression system.

In LRA Section 3.3.2.1.6 and Table 3.3.2-6, the staff reviewed the halon fire protection and reactor coolant pump motor oil leakage collection system aging management review. The applicant credited the periodic surveillance and preventive maintenance program with managing the aging effect of loss of material for the halon fire protection system components. The applicant credited the periodic surveillance and preventive maintenance and boric acid corrosion programs with managing the aging effect of loss of material for the reactor coolant pump motor oil leakage collection system. The staff reviewed the periodic surveillance and preventive maintenance program and finds that its scope includes aging management of components in the halon fire protection and RCP motor oil leakage collection system.

On the basis of its review of the applicant's programs, the staff finds that the boric acid corrosion program and periodic surveillance and preventive maintenance program effectively manage the aging effect of loss of material on halon fire protection system components so that their intended functions will be maintained during the period of extended operation.

The staff concludes that the periodic surveillance and preventive maintenance program, in lieu of the fire protection program, adequately manage the aging effects of halon system components during the period of extended operation.

Operating Experience

The staff reviewed operating experience for the fire protection program. The applicant identified condition report trending data that discovered discrepancies with fire barrier components, and resolved the negative trend data and specific conditions by implementing revised design methods for sealing penetrations.

On the basis of its review of the above operating experience and on discussions with the applicant's technical staff, the staff concludes that AMP B.1.10.1 adequately manages the aging effects that have been observed at the applicant's plant.

UFSAR Supplement

In Appendix A, Section A.2.1.10, of the LRA, the applicant provided the UFSAR supplement for the fire protection program. The staff reviewed this section and verified that the information in the UFSAR supplement provides an adequate summary of the program activities. The staff finds this section of the UFSAR supplement sufficient.

Conclusions

On the basis of its review and audit of the applicant's program, the staff finds that those elements of the program for which the applicant claimed consistency with the GALL program are consistent with the GALL program. In addition, the staff has reviewed the exceptions to the GALL program and finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.5.2 Fire Water System

Summary of Technical Information in the Application

The applicant's fire water system is described in LRA Section B.1.10.2, "Fire Water System." In the LRA, the applicant stated that the program is consistent with, but includes an exception and enhancement to, GALL AMP XI.M27, "Fire Service Water." This AMP is credited with performing periodic inspections and functional tests of the fire barriers and a diesel-driven fire pump to ensure that the operability of the fire barriers is maintained and that the fuel supply line can perform the intended function, respectively.

Staff Evaluation

During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's evaluation of the audit and review are documented in the audit and review report. Furthermore, the staff reviewed the exception and its justification, and the enhancement, to determine whether the AMP, with the exception and enhancement, remains adequate to manage the aging effects for which it is credited.

In Appendix B, Section B.1.10.2, of the LRA, the applicant stated the following exception to GALL AMP XI.M27:

Element: 3: Parameters Monitored/Inspected
Exception: The applicant does not implement NRC Generic Letter (GL) 89-13, "Service Water System Problems Affecting Safety-Related Equipment," commitments in the fire water system program.

The GALL Report identifies the following criterion for the parameters monitored/inspected program element associated with the exception taken:

> GL 89-13 recommends periodic flow testing of infrequently used loops of the fire water system at the maximum design flow to ensure that the system maintains its intended function.

The applicant verifies that every fire main segment (excluding individual system supplies) is clear of obstruction by performing a full-flow test at least once every three years. ISG-04 revised criteria for the GALL AMP XI.M27 parameters monitored/inspected program element to no longer recommend use of GL 89-13 in determining the system's ability to maintain pressure

and internal system corrosion conditions. Rather, ISG-04 recommends either periodic flow testing of the fire water system using the guidelines of NFPA 25, Chapter 13, Annexes A and D, at the maximum design flow, or periodic wall thickness evaluations to ensure that the system maintains its intended function. On the basis of the applicant's commitment to test fire water system components in accordance with the applicable NFPA codes and standards, the staff finds that this exception meets the criteria of ISG-04 and is, therefore, acceptable.

In Appendix B, Section B.1.10.2, of the LRA, the applicant stated the enhancement to GALL AMP XI.M27:

Elements:	1: Scope of Program 4: Detection of Aging Effects
Enhancement	A sample of sprinkler heads will be inspected using the guidance of NFPA 25, Section 2.3.3.1. The NFPA 25 also contains guidance to repeat this sampling every 10 years after the initial field service testing.

The GALL Report identifies the following criterion for the scope of program and detection of aging effects program elements associated with the enhancement:

> Sprinkler systems are inspected once every refueling outage to ensure that signs of degradation, such as corrosion, are detected in a timely manner.

ISG-04 revised criteria for the GALL AMP XI.M27 detection of aging effects program element to recommend sprinkler head inspections before the end of the 50-year sprinkler head service life and at 10-year intervals thereafter during the extended period of operation to ensure that signs of degradation are detected in a timely manner. On the basis of the revised GALL criteria in ISG-04 and the applicant's commitment to rely upon applicable codes and standards to develop test procedures, the staff finds this enhancement to be acceptable.

On the basis of its review of the fire protection and fire water system, the associated engineering report, and the operating experience, the staff determined that the fire protection program is consistent with the GALL Report and that the exceptions and enhancement in the fire protection program are acceptable.

Operating Experience

The staff reviewed operating experience for the fire water system program. Trending data did not identify a need for improvement to this program. The applicant has incorporated industry operating experience regarding the opening of "wet" fire protection systems. Operating experience shows that opening fire protection systems results in oxygenation of the water, leading to increased corrosion of the pipe. The applicant revised its quarterly test requirements for fire protection systems such that they will not open system piping during these tests. The staff reviewed the results and confirmed that no significant aging of fire protection components was identified in the review.

On the basis of its review of the above operating experience and on discussions with the applicant's technical staff, the staff concludes that AMP B.1.10.2 adequately manages the aging effects that have been observed at the applicant's plant or at other nuclear.

UFSAR Supplement

In Appendix A, Section A.2.1.10, of the LRA, the applicant provided the UFSAR supplement for the fire protection program. In Section A.2.1.11 the applicant provides the UFSAR supplement for the fire water system program. The staff reviewed these sections and verified that the information in the UFSAR supplements provides an adequate summary of the program activities. The staff finds these sections of the UFSAR supplement sufficient.

Conclusions

On the basis of its review and audit of the applicant's program, the staff finds that those elements of the program for which the applicant claimed consistency with the GALL Report program are consistent with the GALL Report program. In addition, the staff has reviewed the exceptions and enhancement to the GALL Report program and finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplements for this AMP and finds that they provide an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.6 Reactor Vessel Integrity

Summary of Technical Information in the Application

<TO BE PROVIDED BY - DE >

Staff Evaluation

< DE to insert staff evaluation of enhancements >

Operating Experience

< DE to insert operating experience >

UFSAR Supplement

< DE to insert UFSAR Supplement Review >

Conclusions

< DE to insert Conclusions>

3.0.3.2.7 Service Water Integrity

Summary of Technical Information in the Application

The applicant's service water integrity program is described in LRA Section B.1.24, "Service Water Integrity." In the LRA, the applicant stated that the program will be consistent with, but include exceptions and an enhancement to, GALL program XI.M20, "Open-Cycle Cooling

Water System." This AMP is credited with relying on surveillance and control techniques, based on the recommendations of NRC Generic Letter 89-13, to ensure that the effects of aging on the service water system will be managed for the period of extended operation.

Staff Evaluation

During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's evaluation of the audit and review are documented in the audit and review report. Furthermore, the staff reviewed the exceptions and their justifications, and the enhancement, to determine whether the AMP, with the exceptions and enhancement, remains adequate to manage the aging effects for which it is credited.

In Appendix B, Section B.1.24, of the LRA, the applicant stated the exceptions to GALL AMP XI.M20:

Element: 2: Preventive Actions
Exception: The SWIP components are lined or coated only as deemed necessary, they are not all lined or coated.

Element: 5: Monitoring and Trending
Exception: The frequency of inspections and testing is established according to results, the frequency of these activities is not set to commence annually and during refueling outages.

The applicant stated that the service water integrity program uses lining or coating on components as deemed necessary, whereas GALL program XI.M20 requires the system components to be constructed of appropriate materials, and lined or coated for protection of the underlying metal components against aggressive cooling water environments. The applicant stated that it has conducted various inspections of components over time and either upgraded the material of the component such that no coating is required, or coated the components requiring lining or coating. The staff reviewed the service water integrity program and finds that this exception is acceptable.

The applicant stated that the service water integrity program varies the frequency of inspections and testing frequency according to results, whereas GALL program XI.M20 requires annual testing and testing during refueling outages. The staff finds that the difference in inspection and testing frequency is insignificant since aging effects typically manifest over several years. The inspection frequencies are determined based on engineering evaluation of inspection results and in accordance with the applicant's commitments under GL 89-13. The staff finds this exception to be acceptable.

In Appendix B, Section B.1.24, of the LRA, the applicant stated the enhancement to GALL AMP XI.M20:

Element: 4: Detection of Aging Effects
Enhancement: The program will check for evidence of selective leaching during visual inspections.

The GALL Report identifies the following criterion for the detection of aging effects program

element associated with the enhancement:

> Inspections for biofouling, damaged coatings, and degraded material condition are conducted.

During the audit, the staff asked the applicant to provide the technical justification for performing visual inspections without hardness testing to detect selective leaching. In its response, the applicant stated that details on the enhancements to programs to manage loss of material due to selective leaching are provided in clarification letter 2CAN010401, dated January 22, 2004. The applicant committed to providing these details prior to the period of extended operation. The staff finds this acceptable.

On the basis of its review of this AMP, the associated engineering report, and the operating experience, the staff determined that this AMP is consistent with the GALL Report and that the exceptions and enhancement in the service water integrity program are acceptable.

Operating Experience

The staff reviewed correspondence and reports dealing with the applicant's response to GL 89-13 and subsequent activities related to the SW system. This included a sample of condition reports related to the SW system as well as periodic monitoring and trending data.

During the audit, the staff noted that the LRA indicates that minor through wall piping leaks have occurred and the service water components are routinely inspected to ensure loss of material and cracking will not degrade the ability of the service water system to perform its intended function. The staff asked the applicant to provide the type of inspection used to detect the aging effects of loss of material and cracking and the justification for the inspection method.

In its response, the applicant stated that details on the enhancements to programs to manage loss of material due to selective leaching are provided in clarification letter 2CAN010401, dated January 22, 2004. The applicant committed to providing these details prior to the period of extended operation. The staff finds this acceptable.

On the basis of the its review of the above operating experience and on discussions with the applicant's technical staff, the staff concludes that AMP B.1.24 adequately manages the aging effects that have been observed at the applicant's plant.

UFSAR Supplement

In Appendix A, Section A.2.1.25, of the LRA, the applicant provided the UFSAR supplement for the service water integrity program. The staff reviewed this section and verified that the information in the UFSAR supplement provides an adequate summary of the program activities. The staff finds this section of the UFSAR supplement sufficient.

Conclusions

On the basis of its review and audit of the applicant's program, the staff finds that those elements of the program for which the applicant claimed consistency with the GALL Report program are consistent with the GALL Report program. In addition, the staff has reviewed the

exceptions and enhancement to the GALL Report program and finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.8 Closed Cooling Water Chemistry Control Program

Summary of Technical Information in the Application

The applicant's closed cooling water chemistry control program is described in LRA Section B.1.30.2, "Closed Cooling Water Chemistry Control." In the LRA, the applicant stated that the program is consistent with, but includes exceptions to, GALL program XI.M21, "Closed-cycle Cooling Water System". This AMP is credited with monitoring and inspecting chemistry parameters as preventive measures to manage loss of material, cracking, and fouling for closed cooling water system components.

Staff Evaluation

During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's evaluation of the audit and review are documented in the audit and review report. Furthermore, the staff reviewed the exceptions and their justifications to determine whether the AMP, with the exceptions, remains adequate to manage the aging effects for which it is credited.

The applicant states that it's closed cooling water chemistry control program includes preventive measures that manage loss of material, cracking, and fouling for component cooling water system components. These chemistry activities provide for monitoring and controlling component cooling water chemistry using ANO-2 procedures and processes based on EPRI TR-107396, "Closed Cooling Water Chemistry Guidelines."

In Appendix B, Section B.1.30.2, of the LRA, the applicant stated the exceptions GALL AMP XI.M21:

Element: 3: Parameters Monitored/Inspected
5: Monitoring and Trending
6: Acceptance Criteria
Exception: The program only monitors chemistry parameters.

Element: 4: Detection of Aging Effects
Exception: The program is a preventive program that claims no credit for the detection of aging effects through performance and functional testing.

Element: 6: Acceptance Criteria
Exception: The nitrite corrosion inhibitor concentrations are maintained within specified limits, which allow for larger variance (1200 parts per million, or ppm - 4000 ppm) than recommended (500 ppm - 1000 ppm) in EPRI TR-107396.

The GALL Report identifies the following criteria for program elements: (1) parameters monitored/inspected, (2) monitoring and trending, and (3) acceptance criteria:

(1) The AMP monitors the effects of corrosion by surveillance testing and inspection in accordance with standards in EPRI TR-107396 to evaluate system and component performance. For pumps, the parameters monitored include flow and discharge and suction pressures. For heat exchangers, the parameters monitored include flow, inlet and outlet temperatures, and differential pressure.
(2) Performance and functional tests are performed at least every 18 months to demonstrate system operability, and tests to evaluate heat removal capability of the system and degradation of system components are performed every five years.
(3) System and component performance test results are evaluated in accordance with the guidelines of EPRI TR-107396. Acceptance criteria and tolerances are also based on system design parameters and functions.

The staff determined that EPRI TR-107396 does not recommend equipment performance and functional testing for monitoring the effectiveness of a water chemistry control program. Monitoring pump performance parameters is of little value in managing the effects of aging on long-lived, passive closed cooling water system components. EPRI TR-107396, Section 5.7, stated that performance monitoring is typically part of an engineering program, which would not be part of water chemistry. The report further stated that performance monitoring "...can be used to confirm that conditions in the closed cooling water system are not degrading heat exchanger performance...."

The staff finds that this EPRI guidance neither requires nor negates performance monitoring. The staff reviewed the applicant's procedure on chemistry inspections of plant systems and heat exchangers, and finds that implementation of this procedure enables the applicant to continue to confirm the effectiveness of the closed cooling water chemistry control program via plant inspections. The staff finds this exception to be acceptable.

The GALL Report identifies the following criterion for the detection of aging effects program element associated with the exception taken:

- The extent and schedule of inspections and testing, in accordance with EPRI TR-107396, assure detection of corrosion before the loss of intended function of the component. Performance and functional testing, in accordance with EPRI TR-107396, ensures acceptable functioning of the closed cooling water system or components serviced by the closed cooling water system.

The staff reviewed the applicant's implementation procedure which enables the applicant to confirm the effectiveness of the closed cooling water chemistry control program. Inspections are performed when systems are opened for maintenance, when an adverse trend exists, or when desired by the chemistry department. The component cooling water heat exchangers are inspected to verify the effectiveness of chemistry control every time the heat exchangers are put in wet lay-up. In the past three years, component cooling water heat exchangers have been inspected more than eight times. These inspections have been performed for many years.

The staff finds that aging effects on passive mechanical components in the closed cooling water system are adequately managed without reliance on performance and functional testing.

Therefore, the staff finds this exception to be acceptable.

The GALL Report identifies the following criterion for the “acceptance criteria” program element associated with the exception taken:

- Corrosion inhibitor concentrations are maintained within the limits specified in the EPRI water chemistry guidelines for closed cooling water systems.

The staff noted that the applicant is currently drafting changes to a procedure to incorporate the EPRI guidelines on nitrite corrosion inhibitor. The procedure will specify that nitrite inhibitor concentrations are to be maintained in accordance with EPRI TR-107396.

By letter dated May 19, 2004, the applicant stated, in response to question B.1.30.2-5, that it had revised its procedure to incorporate the EPRI guidelines on nitrite corrosion inhibitor. Therefore, this is no longer an exception to the GALL program.

On the basis of the applicant's response, the staff finds this exception to no longer apply. The staff confirms that the acceptance criteria program element is consistent with the GALL Report with respect to nitrite corrosion inhibitor concentrations, and therefore, finds this to be acceptable.

On the basis of its review of this AMP, the associated engineering report, and the operating experience, the staff determined that this AMP is consistent with the GALL Report and that the exceptions in the closed cooling water chemistry control program are acceptable.

Operating Experience

The operating experience review, performed by the applicant, did not identify any condition reports or licensee event reports relating to chemical excursions in the systems covered under the closed cooling water chemistry control program . Also, the condition report trending data did not identify recurrent component degradation in the systems covered under this AMP. The review of condition reports, condition report trending data, and interviews with the plant technical staff confirmed the program requirements are effectively implemented.

On the basis of its review of the above operating experience and on discussions with the applicant’s technical staff, the staff concludes that AMP B.1.30.2 adequately manages the aging effects that have been observed at the applicant’s plant.

UFSAR Supplement

In Appendix A, Section A.2.1.32, of the LRA, the applicant provided the UFSAR supplement for the water chemistry control – closed cooling water chemistry control program, which states that the closed cooling water chemistry control program includes preventive measures that manage loss of material, cracking, and fouling, as applicable, for component cooling water system components. These chemistry activities provide for monitoring and controlling component cooling water chemistry using procedures and processes based on EPRI TR-107396, “Closed Cooling Water Chemistry Guidelines.”

During the audit, the staff noted that for the closed cycle cooling water system described in the

SRP-LR, Table 3.3-2, it is stated that "...The program relies on preventive measures to minimize corrosion by maintaining inhibitors and by performing non-chemistry monitoring consisting of inspection and nondestructive evaluations based on the guidelines of EPRI-TR-107396 for closed-cycle cooling water systems." During the audit, in question B.1.30.2-7, the staff noted that the applicant neither referred to the inspections performed nor specified the exceptions to GALL AMP XI.M21, "Closed-Cycle Cooling Water System" in LRA Appendix A, Section A.2.1.32. The staff requested that the applicant revise the LRA Appendix A, Section A.2.1.32 to be consistent with the GALL Report, Table 3.3-2, or justify its acceptability (RAI B.1.30.2-1).

In its response dated May 19, 2004, the applicant stated LRA Section B.1.30.2 provides justification for the exceptions between the closed cooling water chemistry control program and GALL AMP XI.M21, including the exception for inspection and nondestructive evaluations; therefore additional information is not required. The applicant stated that the UFSAR Supplement, LRA, Appendix A, Section A.2.1.32 contains a summary description of the program as required by 10 CFR 50.54.21(d).

The staff reviewed the applicant's response and the UFSAR supplement and confirms that it provides an adequate summary description of the program, as identified in the SRP-LR UFSAR supplement table and as required by 10 CFR 54.21(d).

Conclusions

On the basis of its review and audit of the applicant's program, the staff finds that those elements of the program for which the applicant claimed consistency with the GALL Report program are consistent with the GALL Report program. In addition, the staff has reviewed the exceptions to the GALL Report program and finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.0.3.3 AMPs that are Plant-Specific

In Appendix B of the LRA, the applicant indicated that the following AMPs were plant-specific:

- Alloy 600 Aging Management Program (B.1.1)
- Bolting and Torquing Activities Program (B.1.2)
- Heat Exchanger Monitoring Program (B.1.12)
- Inservice Inspection - Containment Inservice Inspection (CII) Program (B.1.13)
- Inservice Inspection - Inservice Inspection (ISI) Program (B.1.14)
- Oil Analysis Program (B.1.17)
- Periodic Surveillance and Preventive Maintenance Program (B.1.18)
- Pressurizer Examinations Program (B.1.19)
- System Walkdown Program (B.1.28)
- Wall Thinning Program (B.1.29)
- Water Chemistry Control - Auxiliary Systems Water Chemistry Control Program (B.1.30.1)

For AMPs that are not consistent with or not addressed by the GALL Report, the staff

performed a complete review of the AMPs to determine if they were adequate to monitor or manage aging. The staff's review of these plant-specific AMPs is documented in the following sections of this SER.

3.0.3.3.1 Alloy 600 Aging Management Program

Summary of Technical Information in the Application

<TO BE PROVIDED BY - DE >

Staff Evaluation

<TO BE PROVIDED BY - DE >

Operating Experience

<TO BE PROVIDED BY - DE >

UFSAR Supplement

<TO BE PROVIDED BY - DE >

Conclusions

<TO BE PROVIDED BY - DE >

3.0.3.3.2 Bolting and Torquing Activities Program

Summary of Technical Information in the Application

<TO BE PROVIDED BY - DE >

Staff Evaluation

<TO BE PROVIDED BY - DE >

Operating Experience

<TO BE PROVIDED BY - DE >

UFSAR Supplement

<TO BE PROVIDED BY - DE >

Conclusions

<TO BE PROVIDED BY - DE >

3.0.3.3.3 Heat Exchanger Monitoring Program

Summary of Technical Information in the Application

The applicant's heat exchanger monitoring program is described in LRA Section B.1.12, "Heat Exchanger Monitoring." In the LRA, the applicant stated that the program is plant-specific and will be initiated prior to the period of extended operation. This AMP is credited with inspecting heat exchangers to detect degradation and, if warranted, evaluating the effects of the degradation on the design functions, including seismic operability.

Staff Evaluation

In accordance with 10 CFR 54.21(a)(3), the staff reviewed the information included in Appendix B, Section B.1.12, of the LRA, regarding the applicant's demonstration of the heat exchanger monitoring program to ensure that the effects of aging, as discussed above, will be adequately managed so that the intended functions will be maintained consistent with the CLB throughout the period of extended operation.

The staff reviewed the heat exchanger monitoring program against the AMP elements found in the SRP-LR, Appendix A, Section A.1.2.3, and SRP-LR Table A.1-1 and focused on how the program manages aging effects through the effective incorporation of 10 elements (i.e., program scope, preventive actions, parameters monitored or inspected, detection of aging effects, monitoring and trending, acceptance criteria, corrective actions, confirmation process, administrative controls, and operating experience.)

The applicant indicated that the corrective actions, confirmation process, and administrative controls are part of the site-controlled quality assurance program. The staff's evaluation of the quality assurance program is provided separately in Section 3.0.4 of this SER. The remaining seven elements are discussed below.

[Scope of the Program] The applicant stated that this program element encompasses managing aging effects on selected heat exchangers as identified in Section 3 of the LRA. The staff reviewed Section 3 of the LRA and determined that the heat exchanger monitoring program is credited with managing aging effects for specific heat exchanger components in the containment spray and emergency diesel generator systems. The staff confirmed that the specific components for which the heat exchanger monitoring program manages aging effect are identified, which satisfies the criterion defined in Appendix A.1 of the SRP-LR. On this basis, the staff finds that the applicant's proposed scope is acceptable.

[Preventive Maintenance] The applicant stated that this is an inspection program and no actions are taken as part of this program to prevent degradation. The staff finds that the heat exchanger monitoring program is a condition monitoring program. It provides early indication and detection of the onset of aging degradation. It does not rely on preventive actions. Therefore, staff finds this acceptable.

[Parameters Monitored or Inspected] The applicant stated that non-destructive examinations will be performed. Eddy current testing will be used to identify wall thinning and cracking in shell-and-tube heat exchangers. Heat exchanger heads, covers, and tube sheets will be inspected using visual inspection methods.

The staff noted that, although traditional eddy current testing methods can be applied to most heat exchanges, the shutdown heat exchanger contains ferritic stainless steel tubes. Traditional eddy current testing methods cannot be used in this application. The applicant has developed a testing method, similar to eddy current testing, that will be used to detect wall thinning and cracking in these tubes. During the audit, the staff requested details on this inspection methodology from the applicant. By letter dated January 22, 2004, the applicant provided details on this methodology. Specifically, the applicant identified a modified version of eddy current testing method called remote field testing as the selected technique, and stated that other appropriate examination techniques may be available at the time of program implementation and will be based on industry operating experience.

The staff reviewed the applicant's response, and finds that the inspection technique is sufficient to provide reasonable assurance that the aging effects for the components addressed by the heat exchangers monitoring program will be detected before loss of intended function.

The staff confirmed that this program element satisfies the criteria defined in Appendix A of the SRP-LR. The heat exchanger monitoring program is acceptable because the non-destructive examinations of the heat exchangers are intended to detect the presence and extent of aging effects. On this basis, the staff finds that the parameters monitored or inspected is acceptable.

[Detection of Aging Effects] The applicant stated, in Appendix B, Section B.1.12 of the LRA, that

- The aging effects being managed by this program for the tubes are loss of material and cracking. An appropriate sample population of heat exchangers will be determined based on operating experience prior to the inspections. The extent and schedule of the inspections prescribed by the program are designed to maintain seismic qualification and ensure that aging effects will be discovered and repaired before the loss of intended function.
- The eddy current inspection of the tubes will be every 10 years, or more frequently if inspection results indicate a need for more frequent inspections. The visual inspections of the accessible heat exchangers will be performed on the same frequency as the eddy current inspections.
- Inspection can reveal cracking and loss of material that could result in degradation in the seismic qualification of the heat exchangers. Fouling is not addressed by this program.

The staff noted that, although traditional eddy current testing methods can be applied to most heat exchanges, the shutdown heat exchanger contains ferritic stainless steel tubes. Traditional eddy current testing methods cannot be used in this application. The applicant has developed a testing method, similar to eddy current testing, that will be used to detect wall thinning and cracking in these tubes. During the audit, the staff requested details on this inspection methodology from the applicant. By letter dated January 22, 2004, the applicant provided details on this methodology. Specifically, the applicant identified a modified version of eddy current testing method called remote field testing as the selected technique, and stated that other appropriate examination techniques may be available at the time of program implementation and will be based on industry operating experience. The staff reviewed the applicant's response, and finds that the inspection technique is acceptable (see discussion above).

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. Testing techniques will be developed, based on industry operating experience; sample population of heat exchangers will be determined based on operating experience prior to the inspections; and eddy current inspection of the tubes will be every 10 years, or more frequently if inspection results indicate a need for more frequent inspections. On this basis, the staff concludes that the detection of aging effects is acceptable.

[Monitoring and Trending] The applicant stated, in Appendix B, Section B.1.12, of the LRA, that the wall thickness of heat exchanger tubing and the material condition of heat exchanger heads, covers, and tube sheets will be trended. Results will be evaluated against established acceptance criteria and an assessment will be made regarding the applicable degradation mechanism, degradation growth rate, and the allowable degradation level. This information will be used to develop future inspection scope and inspection frequency.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. Trending of inspection results will be performed and will enhance the applicant's ability to detect aging effects before there is a loss of intended function. On this basis, the staff finds that the monitoring and trending is acceptable.

[Acceptance Criteria] The applicant stated, in Appendix B, Section B.1.12, of the LRA, that

- The tube plugging limit for each heat exchanger to be eddy-current inspected will be established based upon a component-specific engineering evaluation. This evaluation will determine conservative acceptance criteria that will identify when degraded tubes must be removed from service.
- The acceptance criterion for visual inspections of heat exchanger heads, covers, and tube sheets will be no evidence of degradation that could lead to loss of function. If degradation that could lead to loss of intended function is detected, a condition report will be written and the issue resolved in accordance with the site corrective action program.

During the audit, the staff requested that the applicant provide specific and detailed acceptance criteria and its basis for the heat exchanger monitoring program. By letter dated January 22, 2004, the applicant provided the heat exchanger monitoring program specific acceptance criterion. In its response, the applicant identified that the acceptance criterion for the tube eddy-current inspections will be wall loss less than 60 percent through wall, which follows the industry practice that considers this a conservative standard for requiring evaluation of the need for potential corrective action. In its response, the applicant also stated that the acceptance criterion for eddy current testing of heat exchanger tubes is conservatively based on a combination of ASME code requirements and industry practice. The staff reviewed the applicant's response, and finds it to be acceptable.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. Any degradation that could lead to loss of function will be found unacceptable and corrective measures implemented. On this basis, the staff finds that the acceptance criteria is acceptable.

[Operating Experience] The applicant stated, in Appendix B, Section B.1.12, of the LRA, that the heat exchanger monitoring program is a new program for which there is no operating

experience. The elements that constitute this program are consistent with years of industry practice. The applicant stated that the program will be administered under the site quality assurance (QA) program, which is subject to the requirements of 10 CFR 50, Appendix B.

During the audit, the staff asked the applicant to clarify and/or provide the operating experience reviews for new programs. In its response, the applicant stated that the plant corrective action program, which captures internal and external plant operating experience issues, provides reasonable assurance that operating experience will be reviewed and incorporated in the future to provide objective evidence to support the conclusion that the effects of aging will be adequately managed.

On the basis of its review of the applicant's response and on discussions with the applicant's technical staff, the staff concludes that the heat exchanger monitoring program will adequately manage the aging effects that have been observed at the applicant's plant.

UFSAR Supplement

In Appendix A, Section A.2.1.13, of the LRA, the applicant provided the UFSAR supplement for the heat exchanger monitoring program and stated that the program will manage loss of material and cracking, as applicable, on heat exchangers in various systems. The program will inspect heat exchangers for degradation using non-destructive examinations, such as eddy-current inspections and visual inspections. If degradation is found, then an evaluation will be performed to determine its effects on the heat exchanger's design functions. The applicant stated in Appendix A that the heat exchanger monitoring program will be initiated prior to the period of extended operation. The staff reviewed this section and verified that the information in the UFSAR supplement provides an adequate summary of the program activities, as identified in the SRP-LR UFSAR supplement table and as required by 10 CFR 54.21(d).

Conclusion

On the basis of its review and audit of the applicant's program, the staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.3.4 Inservice Inspection – Containment Inservice Inspection

Summary of Technical Information in the Application

The applicant's inservice inspection – containment inservice inspection program is described in LRA Section B.1.13, "Inservice Inspection – Containment Inservice Inspection." In the LRA, the applicant stated that the program is plant-specific. The applicant also stated that the program implements the applicable requirements of the ASME Boiler and Pressure Vessel Code, Section XI, Subsections IWE and IWL, as modified by 10 CFR 50.55a. Every 10 years the program is updated to the latest ASME Section XI code edition and addendum approved by the NRC in 10 CFR 50.55a. The applicant credits the program, under ASME Section XI, Subsection IWE, with managing loss of material for the steel containment liner and its integral

attachments. The applicant credited the program, under ASME Section XI, Subsection IWL, with confirming that the effects of aging on the reinforced concrete containment shell and post-tensioning systems will not prevent the performance of intended functions consistent with the CLB for the period of extended operation.

Staff Evaluation

In accordance with 10 CFR 54.21(a)(3), the staff reviewed the information included in Appendix B, Section B.1.13, of the LRA, regarding the applicant's demonstration of the inservice inspection – containment inservice inspection program to ensure that the effects of aging, as discussed above, will be adequately managed so that the intended functions will be maintained consistent with the CLB throughout the period of extended operation.

The staff reviewed the inservice inspection – containment inservice inspection program against the AMP elements found in the SRP-LR, Appendix A, Section A.1.2.3, and SRP-LR Table A.1-1 and focused on how the program manages aging effects through the effective incorporation of 10 elements (i.e., program scope, preventive actions, parameters monitored or inspected, detection of aging effects, monitoring and trending, acceptance criteria, corrective actions, confirmation process, administrative controls, and operating experience.)

The applicant indicated that the corrective actions, confirmation process, and administrative controls are part of the site-controlled quality assurance program. The staff's evaluation of the quality assurance program is provided separately in Section 3.0.4 of this SER. The remaining seven elements are discussed below.

[Scope of Program] The applicant stated that the inservice inspection - containment inservice inspection program, under ASME Section XI, Subsection IWE, manages loss of material for the steel containment liner and its integral attachments. This is within the scope of Subsection IWE-1000. Under ASME Section XI, Subsection IWL, the program manages the effects of aging on the reinforced concrete containment shell and post-tensioning systems to ensure that they will perform in accordance with the CLB. This is within the scope of Subsection IWE-1000.

The staff confirmed that the specific components for which the inservice inspection - containment inservice inspection program are identified. The program scope program element satisfies the criterion defined in Appendix A.1 of the SRP-LR. On this basis, staff finds that the applicant's proposed scope is acceptable.

[Preventive Action] The applicant stated that this is a monitoring program that does not include preventive actions. The staff confirmed that the preventive actions program element satisfies the criterion defined in Appendix A.1 of the SRP-LR. The staff did not identify the need for preventive actions for AMP B.1.13 because it is a condition monitoring program.

[Parameters Monitored/Inspected] The applicant stated, in Appendix B, Section B.1.13, of the LRA, that visual inspections for Subsection IWE monitor for corrosion and loss of material of the steel containment liner and its attachments by inspecting the surface for evidence of flaking, blistering, peeling, discoloration, and other signs of distress. For Subsection IWL, prestressing force is measured by lift-off testing or equivalent test which is a TLAA. The staff's review of the applicant's evaluation of this TLAA is documented in Section 4.5 of this SER. In performing this review, the staff followed the guidance in Section 4.5 of the SRP-LR. **< PM or DE to verify >**

In addition, the applicant stated that tendon surveillance testing consists of inspection of the sheathing filler material and anchorage, tendon wire continuity testing, and tendon wire inspection.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. The visual inspections (Subsection IWE) and prestressing force measurements (Subsection IWL) are intended to detect the presence and extent of aging effects. On this basis, the staff finds that the parameters monitored or inspected is acceptable.

[Detection of Aging Effects] The applicant stated that the aging effect being managed under ASME Section XI, Subsection IWE, is loss of material for the steel containment liner and its integral attachments. Under ASME Section XI, Subsection IWL, the program manages the effects of aging on the reinforced concrete containment shell and post-tensioning system. The primary inspection method for the steel containment liner and its integral attachments is visual examination (general visual, VT-3, VT-1). Limited volumetric examination (ultrasonic thickness measurement) and surface examination (e.g., liquid penetrant) may be necessary in some instances. The primary inspection method for the concrete containment shell is visual examination (general, VT-1). The tendon prestressing force is measured by lift-off or equivalent test. Tendon surveillance testing consists of the sheathing filler material and anchorage inspection, tendon lift-off force measurement, tendon wire continuity testing, tendon wire inspection, and tensile testing. The tendon surveillance is performed periodically on a randomly selected group of tendons to provide confidence in the functional capability of the system.

The GALL Report Volume 2, Item IIA.3-1d recommends that examination categories E-B and E-F and additional examinations be performed during the period of extended operation to detect stress corrosion cracking (SCC) of stainless steel and dissimilar metal welds' containment penetration bellows assemblies. This recommendation is addressed in LRA Table 3.5.1, Item Number 3.5.1-2. During the audit, the staff noted that these examination categories were not committed to.

In pursuing this issue, the staff noted that in response to a separate staff RAI 3.5-1, by letter dated May 19, 2004, the applicant stated that no bellows are used for piping system containment penetrations. The fuel transfer tube is equipped with bellows type expansion joints that connect the transfer tube to the liner of the refueling canal in containment and to the liner of the spent fuel pool in the auxiliary building. The applicant stated that Table 3.5.1, Item Number 3.5.1-2 of Table 3.5.1 applies to the fuel transfer tube sleeve but not to the bellows since the bellows is not part of the containment penetration boundary. The bellows connecting the transfer tube to the refueling canal liner is an extension of the refueling canal liner which has no license renewal intended function. The bellows on the other end of the transfer tube connects the transfer tube to the liner in the fuel tilt pit portion of the spent fuel pool. The low point of the opening connecting the spent fuel pool to the tilt pit is above the top of the spent fuel stored in the storage racks so failure of the bellows cannot result in uncovering of the fuel. Therefore, neither bellows attached to the fuel transfer tube performs a license renewal intended function.

On the basis of its review and of the applicant's response to RAI 3.5-1, the staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. The staff acknowledges that the frequency and scope of examination specified in 10 CFR 50.55a and

ASME Section XI, Subsections IWE and IWL, ensure that aging effects will be detected before they compromise the design basis requirements. The inspections use a frequency and sample size based on existing codes and operating experience to detect the presence and extent of aging effects. On this basis, the staff concludes that the parameters monitored or inspected is acceptable.

[Monitoring and Trending] The applicant stated, in Appendix B, Section B.1.13, of the LRA, that that the responsible engineer periodically trends the measured prestressing forces from surveillances. If this review indicates a trend that would result in the tendon forces for a tendon or a group of tendons to be less than the minimum prestress value before the next inspection period, the responsible engineer (or designee) prepares a condition report.

The staff determined that with the exception of inaccessible areas, all metal and concrete surfaces within the scope are monitored by examination requirements of Subsections IWE and IWL. Periodically measured tendon prestressing forces are monitored in accordance with the requirements specified in Subsection IWL and trended to ensure that they remain above the minimum required level. The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. Trending of the surveillance results will enhance the applicant's ability to detect aging effects before there is a loss of intended function. On this basis, the staff finds that the monitoring and trending is acceptable.

[Acceptance Criteria] The applicant stated, in Appendix B, Section B.1.13, of the LRA, that the numerical acceptance standards provided in IWE-3000 for wall thickness and the numerical values provided in IWL-3000 for post-tensioning systems are utilized. No other numerical acceptance standards are provided for the steel containment liner and its integral attachments or for the reinforced concrete containment. The expertise and engineering judgment of the responsible engineer are relied upon to detect conditions that could affect the leak-tightness or structural integrity of the containment or prevent an inspected component from performing its intended function.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. Any wall thickness post-tensioning system values that are projected to fall below the minimum allowable, as determined by the applicable design code, will be found unacceptable and corrective measures implemented. On this basis, the staff finds that the acceptance criteria is acceptable.

[Operating Experience] The staff reviewed the applicant's engineering report related to the operating experience for this program. Condition report trending data for the period 1998 through 2002 did not identify a need for improvements to this program. The applicant also stated that the plant corrective action program, which captures internal and external plant operating experience issues, provides reasonable assurance that operating experience will be reviewed in the future to provide objective evidence to support the conclusion that the effects of aging will be adequately managed.

The staff agrees that even though limited operating experience was available, the inservice inspection – containment inservice inspection programs provided reasonable assurance that the applicable aging effects would be adequately managed for the period of extended operation.

<u>UFSAR Supplement</u>

In Appendix A, Section A.2.1.14, of the LRA, the applicant provided the UFSAR supplement for the inservice inspection – containment inservice inspection program and stated that the program implements the applicable requirements of ASME Section XI, Subsections IWE and IWL as modified by 10 CFR 50.55a. Every 10 years the containment inservice inspection program for ANO-2 is updated to the latest ASME Section XI code edition and addendum approved by the NRC in 10 CFR 50. The staff reviewed this section and verified that the information in the UFSAR supplement provides an adequate summary of the program activities, as identified in the SRP-LR UFSAR supplement table and as required by 10 CFR 54.21(d).

Conclusions

On the basis of its review and audit of the applicant's program, the staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.3.5 Inservice Inspection – Inservice Inspection

Summary of Technical Information in the Application

The applicant's inservice inspection – inservice inspection program is described in LRA Section B.1.14, "Inservice Inspection – Inservice Inspection" The applicant stated that this is a plant-specific program. The applicant credited this program with managing cracking, wear, loss of mechanical closure integrity, and loss of material of RCS piping and components, including RCP items and austenitic stainless steel small bore piping. This program implements the applicable requirements of the ASME Boiler and Pressure Vessel Code, Section XI, Subsections IWB, IWC, IWD, and IWF. In March 2000, ANO-2 entered the third ISI interval and began implementing the applicable requirements of the 1992 Edition of ASME Section XI, with pressure-testing criteria from the 1993 Addenda, approved NRC alternatives and relief requests, and other requirements specified in 10 CFR 50.55a.

Staff Evaluation

In accordance with 10 CFR 54.21(a)(3), the staff reviewed the information included in Appendix B, Section B.1.14, of the LRA, regarding the applicant's demonstration of the inservice inspection – inservice inspection program to ensure that the effects of aging, as discussed above, will be adequately managed so that the intended functions will be maintained consistent with the CLB throughout the period of extended operation.

The staff reviewed the inservice inspection – inservice inspection program against the AMP elements found in the SRP-LR, Appendix A, Section A.1.2.3, and SRP-LR Table A.1-1 and focused on how the program manages aging effects through the effective incorporation of 10 elements (i.e., program scope, preventive actions, parameters monitored or inspected, detection of aging effects, monitoring and trending, acceptance criteria, corrective actions, confirmation process, administrative controls, and operating experience.)

The applicant indicated that the corrective actions, confirmation process, and administrative

controls are part of the site-controlled quality assurance program. The staff's evaluation of the quality assurance program is provided separately in Section 3.0.4 of this SER. The remaining seven elements are discussed below.

[Program Scope] The applicant stated, in Appendix B, Section B.1.14, of the LRA, that the inservice inspection program manages cracking, wear, loss of mechanical closure integrity, and loss of material of RCS piping and components, including RCP items and austenitic stainless steel small bore piping. The inservice inspection program is updated as required to the latest ASME Section XI code edition and addendum approved by the NRC in 10 CFR 50.55a. A risk-informed methodology is used to select Class 1, 2, and 3 piping welds for inspection in lieu of the requirements specified in the 1992 Edition of the ASME Section XI.

The staff reviewed the risk-informed inservice inspection (RI-ISI) methodology to determine if this approach is applicable to the period of extended operation. The applicant stated that there are no time-dependent parameters used that would change the determination of risk for a component as a result of operating during the license renewal period. The applicant also stated that any new degradation mechanism or change in consequence of piping failures that occurs over the license of the plant, including the period of extended operation, is incorporated into the RI-ISI program.

In order to verify the applicant's position, the staff reviewed the technical bases of the RI-ISI program and determined that the program scope is capable of managing the identified aging mechanisms. The applicant demonstrated that the aging effects identified for Class 1 piping are managed by the RI-ISI program. This was accomplished by identifying all the Class 1 piping aging effects that credit the RI-ISI program for aging management. These aging effects were compared with the aging effects identified in one of the RI-ISI program bases documents (EPRI TR-106706). All credited aging effects were found to be included in the program. The applicant also clarified that although the RI-ISI program addresses Class 1, 2, and 3, only the Class 1 portion of the risk-informed program is included in the LRA.

The staff confirmed that the program scope program element satisfies the criterion defined in Appendix A.1 of the SRP-LR. The proposed scope identifies the specific components for which the program manages aging. On this basis, the staff finds that the applicant's proposed program scope is acceptable.

[Preventive Action] The applicant stated that this program element is not applicable because the inservice inspection - inservice inspection program is an inspection program.

The staff confirmed that the preventive actions program element satisfies the criterion defined in Appendix A.1 of the SRP-LR. The staff did not identify the need for preventive actions for this program because it is a condition monitoring program.

[Parameters Monitored/Inspected] The applicant stated, in Appendix B, Section B.1.14, of the LRA, that the program uses non-destructive examination techniques to detect and characterize flaws. The three different types of examinations are volumetric, surface, and visual. Volumetric examinations are the most extensive, using methods such as radiographic, ultrasonic, or eddy current examinations to locate surface and subsurface flaws. Surface examinations, such as magnetic particle or dye penetrant testing, are used to locate surface flaws.

Three levels of visual examinations are specified. The VT-1 visual examination is conducted to assess the condition of the surface of the part being examined, looking for cracks and symptoms of wear, corrosion, erosion, or physical damage. It can be done with either direct visual observation or with remote examination using various optical/video devices. The VT-2 examination is conducted specifically to locate evidence of leakage from pressure-retaining components (period pressure tests). While the system is under pressure for a leakage test, visual examinations are conducted to detect direct or indirect indication of leakage. The VT-3 examination is conducted to determine the general mechanical and structural condition of components and supports and to detect discontinuities and imperfections.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. Measurements of wall thickness are intended to detect the presence and extent of aging effects. On this basis, the staff finds that the parameters monitored or inspected are acceptable.

[Detection of Aging Effects] The applicant stated that:

(1) The aging effects being managed by this program are cracking, wear, loss of mechanical closure integrity, and loss of material of RCS piping, valves and RCP items including bolting, valve bolting, and flange bolted connections. ASME Section XI, Subsection IWB, examination categories manage the aging effects of the Class 1 piping, valves, and RCP items. This program manages the aging effects through a combination of visual, surface, and volumetric examinations. Pressure boundary items undergo a system leakage test including a visual examination (VT-2) in accordance with ASME Section XI requirements.

(2) This program manages cracking of austenitic stainless steel small bore piping. The applicant defined small bore piping and small bore nozzles as those less than four-inch normal pipe size that do not normally receive volumetric inspection in accordance with ASME Section XI. This program includes inspection of selected RCS piping welds. The inspection of RCS piping appropriately addresses cracking of piping greater than one-inch normal pipe size for the period of extended operation.

(3) Cracking of the RCP covers is managed by visual examinations conducted in accordance with ASME Section XI examination Category B-L-2. Volumetric inspections of the pump casing welds are no longer performed at ANO-2 due to implementation of code case N-481. Visual examination of pressure-retaining surfaces is performed in accordance with ASME Section XI requirements.

(4) This program manages cracking of the shell, lower heads and nozzles, and manway bolting, and supplements the boric acid corrosion prevention program in managing loss of material at external surfaces of the pressurizer. ASME Section XI, Subsection IWB, examination categories manage cracking and loss of material of the pressurizer pressure boundary and support items. This program manages cracking through a combination of visual, surface, and volumetric examinations.

(5) This program manages cracking of the reactor vessel, lower head, closure head, nozzles, and reactor vessel bolting, and supplements the boric acid corrosion prevention program in detecting loss of material at external surfaces of the reactor vessel and

control element drive mechanism pressure boundary. ASME Section XI, Subsection IWB, examination categories manage cracking and loss of material of the reactor vessel and control element drive mechanism pressure boundary and support items. In addition to managing cracking, this program detects degradation as a result of wear. Closure studs, washers, nuts, and threaded holes of the vessel closure flange are visually inspected for wear in accordance with ASME Section XI requirements.

(6) Under ASME Section XI, Subsection IWB, the program manages cracking, wear, loss of preload, and loss of material of the reactor vessel internals items through visual examinations. Interior attachments and core support structures associated with the reactor vessel internals undergo a (VT-3) visual examination at the weld (for the attachments) and at the surface (for the core support structures).

(7) Under ASME Section XI, Subsections IWB, IWC, and IWD, the program manages cracking, wear, and loss of material of the steam generator pressure boundary and support items through a combination of visual, surface, and volumetric examinations.

(8) Under ASME Section XI, Subsection IWF, the program manages loss of material for ASME Class 1, 2, and 3 steel piping supports and steel component supports within the containment. The program also manages loss of material for steel base plates, component supports, and threaded fasteners, and cracking for threaded fasteners for ASME Class 1, 2, and 3 steel piping supports and steel component supports.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. The inspections use a frequency and sample size based on existing codes and operating experience to detect the presence and extent of aging effects. On that basis, the staff finds the program is capable of detecting aging effects.

[Monitoring and Trending] The applicant stated that this program does not require monitoring or trending of progressive, time-dependent degradation. Flaws detected are evaluated by comparing the examination results to the acceptance standards in ASME Section XI. Unacceptable indications require detailed analyses, repair, or replacement. The ISI results are recorded and provided to the NRC in accordance with ASME Section XI requirements. Reports describe the scope of the inspection and significant inspection results.

The staff agreed that the frequency of inspection and the inspection method are specified by the Code. Indications found by nondestructive examinations are evaluated in accordance with the Code and, if allowed to remain, will require monitoring and will be used for comparison with future inservice examination results. This provides for trending of the aging effect and establishes a baseline for the degradation process and the extent of degradation with time. The staff accepts this methodology to undertake further programmatic actions, such as repair and replacement, as necessary, to manage these aging effects.

The staff also confirms that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. Trending of the inspection results enhances the applicant's ability to detect aging effects before there is a loss of intended function. On this basis, the staff finds that the monitoring and trending is acceptable.

[Acceptance Criteria] The applicant stated in Appendix B, Section B.1.14, of the LRA, that if a

flaw is discovered during the performance of an ISI examination, an evaluation is conducted in accordance with article IWA-3000, IWB-3000, IWC-3000, IWD-3000, or IWF-3000.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. The staff reviewed the applicant's acceptance criteria and finds that any flaws discovered in the process of performing the inspections are deemed unacceptable and corrective measures are implemented. On this basis, the staff finds that the acceptance criteria is acceptable.

[Operating Experience] The applicant stated, in Appendix B, Section B.1.14, of the LRA, that condition report trending data does not identify a need for improvements to this program. A 2002 self assessment evaluated the inservice inspection programs using the NRC Inspections Guideline 71111.08, "Inservice Inspection Activities." Minor deficiencies were noted and resolved during the evaluation.

The applicant also stated that the plant corrective action program, which captures internal and external plant operating experience issues, provides reasonable assurance that operating experience will be reviewed in the future to provide objective evidence to support the conclusion that the effects of aging will be adequately managed.

On the basis of its review of the above operating experience on the discussions with the applicant's technical staff, the staff finds that the inservice inspection – inservice inspection program adequately manages the aging effects that have been observed at the applicant's plant and can do so during the period of extended operation.

UFSAR Supplement

In Appendix A, Section A.2.1.15, of the LRA, the applicant provided the UFSAR supplement for the inservice inspection program and stated that the program implements the applicable requirements of ASME Section XI, Subsections IWB, IWC, IWD and IWF, and other requirements specified in 10 CFR 50.55a with approved NRC alternatives and relief requests. Every 10 years the inservice inspection program for ANO-2 is updated to the latest ASME Section XI code edition and addendum approved by the NRC in 10 CFR 50. The staff reviewed this section and verified that the information in the UFSAR supplement provides an adequate summary of the program activities, as identified in the SRP-LR UFSAR supplement table and as required by 10 CFR 54.21(d).

Conclusions

On the basis of its review and audit of the applicant's program, the staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.3.6 Oil Analysis

Summary of Technical Information in the Application

The applicant's oil analysis program is described in Section B.1.17, "Oil Analysis," of the LRA. In the LRA, the applicant stated that the program is plant-specific. This AMP is credited with ensuring the oil environment in the mechanical systems is maintained to the required quality.

Staff Evaluation

In accordance with 10 CFR 54.21(a)(3), the staff reviewed the information included in LRA Appendix B, Section B.1.17, of the LRA regarding the applicant's demonstration of the oil analysis program to ensure that the effects of aging, as discussed above, will be adequately managed so that the intended functions will be maintained consistent with the CLB throughout the period of extended operation.

The staff reviewed the oil analysis program against the AMP elements found in the SRP-LR, Appendix A, Section A.1.2.3, and SRP-LR Table A.1-1 and focused on how the program manages aging effects through the effective incorporation of 10 elements (i.e., program scope, preventive actions, parameters monitored or inspected, detection of aging effects, monitoring and trending, acceptance criteria, corrective actions, confirmation process, administrative controls, and operating experience.)

The applicant indicated that the corrective actions, confirmation process, and administrative controls are part of the site-controlled quality assurance program. The staff's evaluation of the quality assurance program is provided separately in Section 3.0.4 of this SER. The remaining seven elements are discussed below.

[Scope of Program] The applicant stated, in Appendix B, Section B.1.17, of the LRA, that the oil analysis program encompasses periodic sampling of the lubricating oil to which plant components subject to an AMR are exposed. The purpose of the program is to ensure the oil environment in the mechanical systems is maintained to the required quality.

The staff also confirmed that the specific components for which the oil analysis program manages aging are identified and that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. On this basis, the staff finds that the applicant's proposed scope is acceptable.

[Preventive Actions] The applicant stated that the oil analysis program maintains oil systems free of contaminants (primarily water and particulates) thereby preserving an environment that is not conducive to aging mechanisms.

The staff confirmed that the preventive actions program element satisfies the criterion defined in Appendix A.1 of the SRP-LR. The staff finds that the preventive actions program element is acceptable because maintenance of contaminant-free oil systems prevents and mitigates the identified aging effects.

[Parameters Monitored/Inspected] The applicant stated that for components with periodic oil changes in accordance with manufacturer's recommendations, a particle count and check for water are performed to detect evidence of abnormal wear rates, contamination by moisture, or excessive corrosion. For components that do not have regular oil changes, viscosity and neutralization number are also determined to verify the oil is suitable for continued use.

The staff reviewed the applicant's program, procedures, and database of lube oil sample results. The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. The oil sampling program activities detect the conditions that potentiate degradation and also detect the presence and extent of aging effects. On this basis, the staff finds that the parameters monitored or inspected program element is acceptable.

[Detection of Aging Effects] The applicant stated, in Appendix B, Section B.1.17, of the LRA, that periodic sampling and compliance with the acceptance criteria provide assurance that lube oil contaminants do not exceed acceptable levels. This manages the aging effects of cracking, loss of material, and fouling.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. (Sampling from a population is not applicable to this AMP.) Sampling is appropriately described and linked to the aging effects and compliance with the acceptance criteria allow for the timely detection of their presence and extent. Appropriate industry standards such as SAE749D, ISO 4406, ISO 112218, and NAS 1638 are used in the development of sampling methods and frequencies. On this basis, the staff finds that the detection of aging effects is acceptable.

[Monitoring and Trending] The applicant stated that oil analysis results are reviewed to determine if alert levels or limits have been reached or exceeded. This review also checks for unusual trends. The staff examined the procedures and tools used for this purpose and considers them to be effective.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. The staff also examined the procedures and tools used for this purpose. Trending of the analysis results is performed and enhances the applicant's ability to detect aging effects before there is a loss of intended function. On this basis, the staff finds that the monitoring and trending is acceptable.

[Acceptance Criteria] The applicant stated for the oil analysis program that particle concentration limits are based on industry standards and water concentration will not exceed 0.1%. Viscosity bands are based on a tolerance of 10% around the base viscosity of the lubricating oil. Metal limits by spectral analysis and ferrography are based on original baseline data and manufacturer's recommendations.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. Any contaminant values that are projected to exceed limits (determined on the basis of the applicable standards and manufacturers' recommendations documented in the implementing procedures), result in the implementation of corrective measures. On this basis, the staff finds the acceptance criteria acceptable.

[Operating Experience] The applicant stated, in Appendix B, Section B.1.17, of the LRA, that condition report trending data does not identify a need for improvements to this program.

The staff has reviewed past test results and noted that the data are maintained within specifications. That evaluation concluded that the oil analysis program is being implemented as described in plant procedures and is an effective preventive maintenance program. During the audit, the staff reviewed more recent data on oil in contact with components subject to aging

management and confirmed that lubricating oils continue to be maintained free of excess water and contamination. Proper additives remain present to neutralize acids that may form during component operation. This operating experience indicates that the program has maintained the quality of lubricating oils within specified limits to mitigate aging effects that could compromise the intended functions of components in this environment.

On the basis of its review of the above operating experience and on the discussions with the applicant's technical staff, the staff finds that the oil analysis program adequately manages the aging effects that have been observed at the applicant's plant and can do so during the period of extended operation.

UFSAR Supplement

In Appendix A, Section A.2.1.18, of the LRA, the applicant provided the UFSAR supplement for the oil analysis program and stated that the program ensures the oil environment in mechanical systems in the scope of license renewal is maintained to the required quality. By monitoring oil quality, the program maintains oil systems free of contaminants (primarily water and particulates) thereby preserving an environment that is not conducive to loss of material, cracking, or fouling. The staff reviewed this section and verified that the information in the UFSAR supplement provides an adequate summary of the program activities, as identified in the SRP-LR UFSAR supplement table and as required by 10 CFR 54.21(d).

Conclusions

On the basis of its review and audit of the applicant's program, the staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.3.7 Periodic Surveillance and Preventive Maintenance

Summary of Technical Information in the Application

The applicant's periodic surveillance and preventive maintenance program is described in LRA Section B.1.18, "Periodic Surveillance and Preventive Maintenance." In the LRA, the applicant stated that the program is plant-specific. This AMP is credited with performing periodic inspections and tests that are relied on to manage aging effects that are not managed by other AMPs. The periodic inspections and tests are generally implemented through repetitive tasks or routine monitoring of plant operations.

Staff Evaluation

In accordance with 10 CFR 54.21(a)(3), the staff reviewed the information included in Appendix B, Section B.1.18, of the LRA regarding the applicant's demonstration of the periodic surveillance and preventive maintenance program to ensure that the effects of aging, as discussed above, will be adequately managed so that the intended functions will be maintained consistent with the CLB throughout the period of extended operation.

The staff reviewed the periodic surveillance and preventive maintenance program against the AMP elements found in the SRP-LR, Appendix A, Section A.1.2.3, and SRP-LR Table A.1-1 and focused on how the program manages aging effects through the effective incorporation of 10 elements (i.e., program scope, preventive actions, parameters monitored or inspected, detection of aging effects, monitoring and trending, acceptance criteria, corrective actions, confirmation process, administrative controls, and operating experience.)

The applicant indicated that the corrective actions, confirmation process, and administrative controls are part of the site-controlled quality assurance program. The staff's evaluation of the quality assurance program is provided separately in Section 3.0.4 of this SER. The remaining seven elements are discussed below.

[Scope of Program] The applicant stated that periodic surveillance and preventive maintenance program encompasses those tasks credited with managing the aging effects identified in the AMRs. The preventive maintenance and surveillance testing activities are generally implemented through repetitive tasks or routine monitoring of plant operations.

The staff examined the applicant's summary engineering report of aging management reviews in which the preventive maintenance and surveillance program is credited for the aging management of a large number of items. Components are identified with this program only if management of one or more of the aging effects to which they are susceptible is not addressed in other AMPs. The following systems credit this program for management of aging effects: (1) emergency core cooling; (2) containment spray; (3) containment cooling; (4) containment penetrations; (5) EDG; (6) chemical and volume control; (7) alternate AC (AAC) diesel generator; (8) halon fire protection and RCP motor oil leakage collection; (9) fuel oil; (10) service water (SW); (11) auxiliary building ventilation; (12) control room ventilation; (13) emergency feedwater; (14) auxiliary building, turbine building, and yard structures; and (15) intake structure and emergency cooling pond.

The staff confirmed that the program scope program element satisfies the criterion defined in Appendix A.1 of the SRP-LR. The proposed scope identifies the specific components for which the program manages aging. On this basis, the staff finds that the applicant's proposed program is acceptable.

[Preventive Action] The applicant stated that the inspections and testing activities used to identify component aging effects do not prevent aging effects. However, the activities are intended to prevent failures of components that might be caused by aging effects.

The staff confirmed that the preventive actions program element satisfies the criterion defined in Appendix A.1 of the SRP-LR. The periodic surveillance and preventive maintenance program activities are intended to identified component aging effect and prevent failures of components that might be caused by aging effects and is consistent with Branch Technical Position RLSB-1. On this basis, the staff finds the preventive action acceptable.

[Parameters Monitored/Inspected] The applicant stated that this program provides instructions for monitoring SSCs to detect degradation. Inspection and testing activities monitor various parameters including system flow, system pressure, surface condition, loss of material, presence of corrosion products, and signs of cracking.

The staff sampled components in the engineered safety features systems and auxiliary systems. Periodic surveillance and preventive maintenance program activities that are credited for aging management were reviewed according to their associated repetitive task numbers. The applicant's commitment tracking system has been invoked to ensure that the surveillance and preventive maintenance requirements will remain subject to appropriate administrative controls. The applicant's method of controlling such commitments was examined in sufficient detail to permit confidence that once correctly identified, parameters relevant to extended operation would be monitored as required. For those components audited, the parameters monitored were reviewed and determined to be closely linked to the intended function of components managed under the periodic surveillance and preventive maintenance program. The inspection and testing activities are planned so as to detect the presence and extent of aging effects.

The staff confirmed that this program element satisfies the criteria defined in Appendix A of the SRP-LR. On the basis of interviews with the applicant's technical staff, the staff finds the applicant's parameters monitored or inspected to be acceptable.

[Detection of Aging Effects] The applicant stated, for the periodic surveillance and preventive maintenance program, that

(1) Preventive maintenance activities provide for periodic component inspections and testing to detect aging effects. Inspection intervals are established such that they provide for timely detection of degradation. Inspection intervals are dependent on the component material and environment and take into consideration industry and plant-specific operating experience and manufacturer's recommendations.

(2) The extent and schedule of inspections and testing assure detection of component degradation prior to loss of intended functions. Established techniques such as visual inspections are used.

(3) Containment spray system pump seal heat exchanger testing manages fouling on the borated water side of the heat exchanger tubing. Containment sump inspection manages loss of material on stainless steel components in the containment sump. Emergency diesel generator maintenance inspections manage loss of material (including that due to selective leaching), cracking, fouling, and change in material properties for various materials. Emergency diesel generator surveillance testing manages fouling on air and treated water sides of the EDG air cooler heat exchangers. Chemical and volume control system periodic surveillance testing manages loss of material of charging pump casings. AAC diesel generator maintenance inspections manage loss of material (including that due to selective leaching), cracking, and change in material properties for various materials. AAC diesel generator surveillance testing manages fouling on heat exchanger tubing of the engine cooling water radiator, aftercooler heat exchanger, and lube oil heat exchanger. The CPC room halon system visual inspection manages loss of material for external and internal surfaces of carbon steel components. The RCP motor oil leakage collection system visual inspection manages loss of material for carbon steel and stainless steel components. Maintenance inspections of fuel oil system components manage loss of material, cracking, and change in material properties for various materials. Diesel generator surveillance testing manages fouling on the heat exchanger tubing of the diesel fuel oil return cooler.

Service water system surveillance testing manages loss of material on bolting, filters, and pump casings. Auxiliary building ventilation system testing manages fouling on both the water and air sides of copper alloy cooling coils, and loss of material for external copper alloy cooling coil surfaces and for internal surfaces of the carbon steel cooling coil housing. Auxiliary building ventilation system testing manages change in material properties and cracking of elastomer flexible connections. Control room ventilation system testing manages loss of material and fouling for copper alloy, carbon steel, and stainless steel components. Control room ventilation system testing manages cracking and change in material properties of elastomer flexible connections. Emergency feedwater system testing and inspections manage loss of material and fouling on carbon steel and copper components in the emergency feedwater system. Battery rack inspection manages loss of material for in-scope battery racks.

(4) Low pressure safety injection (LPSI) and high-pressure safety injection (HPSI) pump surveillance testing currently manages fouling on the borated water side of heat exchanger tubing of LPSI and HPSI pump seal coolers and fouling on the raw water side of HPSI pump bearing housings internal surfaces. For license renewal, the program will additionally inspect the interior of the bearing housings for the HPSI pumps for loss of material (including that due to selective leaching). Acceptance criteria and corrective actions for this enhancement will be specified.

(5) Periodic inspection of the external (air) side of containment SW cooling coils currently manages fouling and loss of material for the copper alloy cooling coils. For license renewal, the work orders for cleaning and inspecting the cooling coils of 2VCC-2A/B/C/D will be enhanced to include inspections to confirm the following conditions: no corroded parts or areas; and no accumulation of dirt or sludge that would affect the cooling ability of the coils.

(6) Periodic inspection of the interior and exterior of the cooling coil housing currently manages the effect of loss of material on carbon and stainless steel components. This includes inspection of the housing floor, coils, coil mounting bolts, frame, drain pans, and flanges. For license renewal, the work orders for cleaning and inspecting the housings of 2VCC-2A/B/C/D will be enhanced to include inspections of the interior and exterior of the housings to confirm the following conditions: no degradation of housing floor that would impact seismic qualification or affect required pressure boundary; no loose or degraded upper or lower coil mounting fasteners that would allow the coil to fall and block the drop-out dampers if an earthquake were to occur; and no significant corrosion or degradation of exterior surfaces, including the flanges of the SW coils, that could affect coil seismic qualification, required pressure boundary, or the ability to transfer the required heat load.

(7) During the monthly electrical penetration nitrogen leak rate test, if bottle pressure is too low, the bottles are replaced. The elastomer flex hoses in the electrical penetration nitrogen pressurization system are checked for cracking and change in material properties during replacement of nitrogen bottles.

(8) Annual emergency cooling pond sounding manages loss of form for the emergency cooling pond natural soils. Accessible and exposed surfaces are visually inspected along with sounding for pond level. Areas of the cooling pond are inspected for

excessive erosion, degradation of riprap, or silt buildup.

During its review, the staff requested that the applicant identify how specific aging effects are detected and the associated technical basis, because different aging mechanisms require different detection methods. The staff requested that the applicant provide the emergency diesel generator maintenance inspections and emergency diesel generator surveillance testing as examples.

In its response dated July 22, 2004, the applicant provided a table listing the aging effect detection methods for aging effects such as loss of material (including that due to selective leaching), cracking, fouling, and change in material properties, and the technical basis for emergency diesel generator maintenance inspections. On the basis that the applicant provided adequate technical justification for the aging effect detection methods, the staff finds this acceptable.

Additionally, the staff asked the applicant to clarify, with regard to the chemical and volume control system (CVCS) periodic surveillance testing, what specific inspections or tests are conducted to assure that aging is not occurring in the charging pump casings, and to identify the frequency and acceptance criteria applicable to this surveillance testing. The staff also asked the applicant to identify specific criteria and operating experience that demonstrate loss of material in the charging pump casings is being effectively managed.

In its response dated July 22, 2004, the applicant provided the parameters monitored, detection of aging effects, monitoring and trending, acceptance criteria, and operating experience for loss of material due to wear and cracking due to fatigue aging effects for the CVCS charging pump casings. On the basis that the applicant provided the inspections and tests, acceptance criteria, and operating experience related to loss of material and cracking aging effects for the CVCS charging pump casings, the project team finds this acceptable.

The staff observed that measurements and inspections of other selected systems' surveillances use a frequency and sample size based on operating experience to detect the presence and extent of aging effects. The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. On the basis of its review of the applicant's responses, the staff finds that the detection of aging effects is acceptable.

[Monitoring and Trending] The applicant stated that preventive maintenance and surveillance testing activities provide for monitoring and trending of aging degradation. Inspection and testing intervals are established such that they provide for timely detection of component degradation. Inspection and testing intervals are dependent on the component material and environment and take into consideration industry and plant-specific operating experience and manufacturers' recommendations.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. The staff noted that there are specific activities that will not be within the scope of the program until the license is renewed. The staff reviewed the applicant's commitment management program, which is used to ensure that these changes will be properly implemented, as well as the specific record originated to track the implementation of modifications necessitated by license renewal. Trending of the inspection results will enhance the applicant's ability to detect aging effects before there is a loss of intended function. On the

basis of its review of the monitoring and trending, the staff finds it acceptable.

[Acceptance Criteria] The applicant stated that the periodic surveillance and preventive maintenance program acceptance criteria are defined in specific inspection and testing procedures. The acceptance criteria confirm component integrity by verifying the absence of aging effect or by comparing applicable parameters to limits based on applicable intended functions established by the plant design basis.

The staff confirmed that this program element satisfies the criteria defined in Appendix A of the SRP-LR. The staff reviewed a selection of the repetitive tasks and associated procedures. In all cases where an aging effect had been identified, appropriate acceptance criteria were provided. While this offers some confidence that additional aging effects will be appropriately monitored, the codes and/or standards to be applied (and methods of assessment) have yet to be specified for the full license renewal scope. On the basis of its review of the applicant's acceptance criteria program element, the staff finds that any degradation to component integrity below the minimum allowable is unacceptable and corrective measures are implemented. On this basis, the staff finds the acceptance criteria program element to be acceptable.

[Operating Experience] The applicant stated that the plant's history of successful operation demonstrates that typical surveillance and preventive maintenance activities have been effective in managing the effects of aging on components.

The staff reviewed the applicant's programmatic experience with surveillance and maintenance activities. Although numerous deficiencies were identified, corrective actions were implemented and their effectiveness has been documented. This supports the conclusion that the program has been effective and will support license renewal. The applicant also stated that the plant corrective action program, which captures internal and external plant operating experience issues, provides reasonable assurance that operating experience will be reviewed in the future to provide objective evidence to support the conclusion that the effects of aging will be adequately managed. On the basis of its review of the above operating experience and on discussions with the applicant's technical staff, the staff concludes that the periodic surveillance and preventive maintenance program adequately manages the aging effects that have been observed at the applicant's plant.

UFSAR Supplement

In Appendix A, Section A.2.1.19, of the LRA, the applicant provided the UFSAR supplement for the periodic surveillance and preventive maintenance program and stated that the program consists of periodic inspections and tests that are relied on to manage aging effects that are not managed by other AMPs. Preventive maintenance and surveillance testing activities provide for periodic component inspections and testing to detect various aging effects applicable to those components included in the program for license renewal. The staff reviewed this section and verified that the information in the UFSAR supplement provides an adequate summary of the program activities, as identified in the SRP-LR UFSAR supplement table and as required by 10 CFR 54.21(d).

Conclusions

On the basis of its review and audit of the applicant's program, the staff finds that the applicant

has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.3.8 Pressurizer Examinations Program

Summary of Technical Information in the Application

The applicant's pressurizer examinations program is described in LRA Section B.1.19, "Pressurizer Examinations." In the LRA, the applicant stated that the program is plant-specific. The AMP is credited with identification of pressurizer cladding cracking, which could potentially cause loss of intended function of the pressurizer.

Staff Evaluation

In accordance with 10 CFR 54.21(a)(3), the staff reviewed the information included in Appendix B, Section B.1.19, of the LRA, regarding the applicant's demonstration of the pressurizer examinations program to ensure that the effects of aging, as discussed above, will be adequately managed so that the intended functions will be maintained consistent with the CLB throughout the period of extended operation.

The staff reviewed the pressurizer examinations program against the AMP elements found in the SRP-LR, Appendix A, Section A.1.2.3, and SRP-LR Table A.1-1 and focused on how the program manages aging effects through the effective incorporation of 10 elements (i.e., program scope, preventive actions, parameters monitored or inspected, detection of aging effects, monitoring and trending, acceptance criteria, corrective actions, confirmation process, administrative controls, and operating experience.)

The applicant indicated that the corrective actions, confirmation process, and administrative controls are part of the site-controlled quality assurance program. The staff's evaluation of the quality assurance program is provided separately in Section 3.0.4 of this SER. The remaining seven elements are discussed below.

[Program Scope] The applicant stated, in Appendix B, Section B.1.19, of the LRA, that the pressurizer examinations program will manage cracking of the stainless steel and nickel-based alloy cladding and attachment welds to the cladding of the pressurizer by examination of the adjacent base metal. The pressurizer shell and upper head are clad with austenitic stainless steel. The lower head is clad with nickel-based alloy.

During the audit, in RAI B.1.19-1, the staff asked the applicant to confirm that the pressurizer examinations program comprises activities performed under the existing inservice inspection program, and if it is an existing program, to update the UFSAR supplement, LRA Section A.2.1.20.

In its response to RAI B.1.19-1, by letter dated July 22, 2004, the applicant stated that the pressurizer examinations program comprises activities performed under the existing inservice inspection program and that, upon incorporation into the safety analysis report, the UFSAR

supplement LRA Section A.2.1.20 will be revised to indicate that the pressurizer examinations program is an existing program. On the basis of its review of the applicant's response, the staff finds this acceptance, and the RAI is resolved.

The staff confirmed that the program scope program element satisfies the criterion defined in Appendix A.1 of the SRP-LR. The proposed scope identifies the specific components for which the program manages aging. On this basis, the staff finds that the applicant's proposed program scope is acceptable.

[Preventive Actions] The applicant stated the pressurizer examinations program is an inspection program and that no actions will be taken as part of this program to prevent aging effects or mitigate aging degradation. However, the applicant added that the its water chemistry control program includes effective actions to avoid SCC of the cladding and attachment welds.

The staff confirmed that the preventive actions program element satisfies the criterion defined in Appendix A.1 of the SRP-LR. The staff did not identify the need for preventive actions for this program because it is a condition monitoring program.

[Parameters Monitored] The applicant stated that (1) in order to provide assurance that cracking of the pressurizer cladding has not propagated into the underlying base metal of the pressurizer, volumetric examination of pressurizer items that are susceptible to cracking will be performed. Cracking of the pressurizer stainless steel cladding would most likely result from thermal fatigue and cracking of the nickel-based alloy cladding would most likely result from primary water SCC and fatigue. The pressurizer pressure boundary items with high fatigue cumulative usage factors include the circumferential weld at the head-to-shell junction and the surge nozzle to shell junction and (2) in accordance with ASME Section XI, Examination Category B-B, volumetric examination of essentially 100% of the circumferential shell-to-head weld will be performed. In addition, the weld metal between the surge nozzle and the vessel lower head will be subjected to high stress cycles. Periodic monitoring of this area provides monitoring for cracking of the nickel-based alloy cladding that may propagate to the underlying ferritic steel. The weld that connects the surge nozzle to the lower head will receive volumetric examination in accordance with Examination Category B-D. These examinations will continue through the period of extended operation to manage cracking of cladding that may extend into the base metal at susceptible locations.

The staff confirmed that this program element satisfies the criteria defined in Appendix A of the SRP-LR. The evaluations of cladding and weld integrity are intended to detect the presence and extent of aging effects. On this basis, the staff finds that the parameters monitored or inspected are acceptable.

[Detection of Aging Effects] The applicant stated that detection of cracking in the pressurizer cladding will be achieved through periodic volumetric inspections of the base metal as required by ASME Section XI. Inspection of these items constitutes an appropriate sample of the remaining stainless steel and nickel-based alloy clad items in the pressurizer. Information in Table IWB 2500-1 describes the inspection sampling requirements, the examination methods, and the examination frequencies for the pressurizer. Detection of cracking will be achieved through periodic volumetric inspections as required by ASME Section XI.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. The applicant stated that inspections will use a frequency and sample size based on existing codes and operating experience, to detect the presence and extent of aging effects. On this basis, the staff finds that the detection of aging effects is acceptable.

[Monitoring and Trending] The applicant stated that (1) during the course of the inspections, the extent of surface or volumetric flaws will be characterized by non-destructive examinations. Anomalous indications that are signs of degradation will be recorded on non-destructive examination reports in accordance with plant procedures and (2) the corrective action program and the requirements of ASME Section XI will address trending of flaws detected.

The staff confirmed that this program element satisfies the criteria defined in Appendix A of the SRP-LR. Trending of the inspection results will enhance the applicant's ability to detect aging effects before there is a loss of intended function. On this basis, the staff finds that the monitoring and trending is acceptable.

[Acceptance Criteria] The applicant stated that acceptance criteria for volumetric examinations will be in accordance with ASME Section XI, IWB-3510 and IWB-3512.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. The staff finds that any volumetric examination results that fall below the minimum allowable, as determined by the applicable design code, will be found unacceptable and corrective measures implemented. On that basis, the staff finds that the acceptance criteria is acceptable.

[Operating Experience] The applicant stated, in Appendix B, Section B.1.19, of the LRA, that its pressurizer examinations program is a new program for which there is no operating experience. The program will include volumetric examinations of pressurizer items having high susceptibility to thermal fatigue. Cracking of the cladding that extends into the base metal will be detected by ASME Section XI volumetric examinations at these locations. The volumetric inspections will be performed with ISI techniques that have been proven effective within the industry at detecting cracking before loss of function occurs.

In the LRA, the applicant stated that the program is based on proven ISI techniques that can effectively manage cracking of pressurizer cladding. This program will provide reasonable assurance that the aging effects will be managed so that the pressurizer will continue to perform its intended functions consistent with the CLB for the period of extended operation.

During the audit, the staff asked the applicant to clarify and/or provide the operating experience reviews for new programs. In its response, the applicant stated that the plant corrective action program, which captures internal and external plant operating experience issues, provides reasonable assurance that operating experience will be reviewed and incorporated in the future to provide objective evidence to support the conclusion that the effects of aging will be adequately managed.

The staff agrees that even though limited operating experience was available, the pressurizer examinations program provided reasonable assurance that the applicable aging effects would be adequately managed for the period of extended operation.

UFSAR Supplement

In Appendix A, Section A.2.1.20, of the LRA, the applicant provided the UFSAR supplement for the pressurizer examinations program and stated that the program will use volumetric examinations required by ASME Section XI to manage cracking of the stainless steel and nickel-based alloy cladding and attachment welds to the cladding which may propagate into the underlying ferritic steel. Volumetric examination of the circumferential shell-to-head weld and the weld metal between the surge nozzle and the vessel lower head will be performed each ISI inspection interval. The applicant stated in Appendix A that the pressurizer examinations program will be implemented prior to the period of extended operation. As stated in its response to RAI B.1.19-1, the applicant stated that UFSAR supplement A.2.1.20 will be revised to indicate that the pressurizer examinations program is an existing program. The staff reviewed this section and verified that the information in the UFSAR supplement provides an adequate summary of the program activities, as identified in the SRP-LR UFSAR supplement table and as required by 10 CFR 54.21(d).

Conclusions

On the basis of its review and audit of the applicant's program, the staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.3.9 System Walkdown Program

Summary of Technical Information in the Application

The applicant's system walkdown program is described in LRA Section B.1.28, "System Walkdown." In the LRA, the applicant stated that the program is plant-specific. The AMP is credited with managing aging effects on systems and components within the scope of license renewal and subject to aging management review.

Staff Evaluation

In accordance with 10 CFR 54.21(a)(3), the staff reviewed the information included in Appendix B, Section B.1.19, of the LRA, regarding the applicant's demonstration of the system walkdown program to ensure that the effects of aging, as discussed above, will be adequately managed so that the intended functions will be maintained consistent with the CLB throughout the period of extended operation.

The staff reviewed the system walkdown program against the AMP elements found in the SRP-LR, Appendix A, Section A.1.2.3, and SRP-LR Table A.1-1 and focused on how the program manages aging effects through the effective incorporation of 10 elements (i.e., program scope, preventive actions, parameters monitored or inspected, detection of aging effects, monitoring and trending, acceptance criteria, corrective actions, confirmation process, administrative controls, and operating experience.)

The applicant indicated that the corrective actions, confirmation process, and administrative controls are part of the site-controlled quality assurance program. The staff's evaluation of the quality assurance program is provided separately in Section 3.0.4 of this SER. The remaining seven elements are discussed below.

[Program Scope] The applicant stated, in Appendix B, Section B.1.28, of the LRA, that the system walkdown program includes inspections of external surfaces of ANO-2 components within the scope of license renewal and subject to an aging management review. The program is credited with managing loss of material from internal surfaces for situations in which the external surface condition is representative of the internal surface condition and both have the same environment. The program is also credited with detecting leakage and spray from liquid-filled low-energy systems before such leakage can prevent satisfactory accomplishment of safety functions.

The staff confirmed that the program scope program element satisfies the criterion defined in Appendix A.1 of the SRP-LR. The proposed scope identifies the specific components for which the program manages aging. On this basis, the staff finds that the applicant's proposed program scope is acceptable.

[Preventive Actions] The applicant stated that the system walkdown program is an inspection program and no actions will be taken as part of this program to prevent or mitigate aging degradation.

The staff confirmed that the program element satisfies the criterion defined in Appendix A.1 of the SRP-LR. The staff did not identify the need for preventive actions since the system walkdown program is a condition monitoring program.

[Parameters Monitored/Inspected] The applicant stated that during a walkdown, the engineer monitors for items which could affect system performance, safety, or reliability as well as general housekeeping, personnel safety hazards, and radiological concerns. Examples of parameters inspected during the system walkdown are condition and placement of coatings, evidence of corrosion, and indications of leakage.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. The system walkdown activities are intended to detect the presence and extent of aging effects. On this basis, the staff finds that the parameters monitored or inspected is acceptable.

[Detection of Aging Effects] The applicant stated (1) a general visual inspection is conducted on readily accessible system and component surfaces during walkdowns, (2) component walkdowns are performed periodically at a frequency dependent on the component being inspected and (3) for each system that credits the program, system engineers are expected to perform a walkdown at least once per refueling cycle. The frequency of inspection is acceptable because aging effects are typically caused by relatively long-term degradation mechanisms such as corrosion.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. The walkdowns are conducted, using a frequency and sample size based on operating experience, to detect the presence and extent of aging effects. On that basis, the

staff finds that the detection of aging effects is acceptable.

[Monitoring and Trending] The applicant stated that (1) the program uses standardized monitoring and trending activities to track degradation. Deficiencies are documented so that results can be trended. In addition to preparing a written description and noting the location, this may also include collecting measurements to determine the severity of deterioration, taking photographs, or drawing sketches and (2) component inspections are conducted by qualified engineers using predefined checklists. Personnel are qualified in accordance with the engineering support personnel training program that provides assurance of an appropriate level of knowledge and experience prior to performing engineering activities.

The staff confirmed that this program element satisfies the criteria defined in Appendix A of the SRP-LR. Trending of the inspection results will enhance the applicant's ability to detect aging effects before there is a loss of intended function. On this basis, the staff finds that the monitoring and trending is acceptable.

[Acceptance Criteria] The applicant stated that, for the system walkdown program, all unacceptable visual indications of cracking, loss of material, or change of material properties of components are documented as deficiencies.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. The staff finds that any deficiencies will be found unacceptable and corrective measures implemented. On this basis, the staff finds that the acceptance criteria is acceptable.

[Operating Experience] The applicant stated, in Appendix B, Section B.1.28, of the LRA, that the condition reports document conditions identified during walkdowns, including instances of corrosion, paint flaking, excessive wear, plant environment issues, leakage, loose parts, bent or broken parts, and numerous other material conditions. Condition report trending data did not identify a need for improvement to this program. Operating experience demonstrated that under the program coating deficiencies, evidence of corrosion, and indications of leakage were being adequately detected and corrective action was initiated as required. The applicant also stated that the plant corrective action program, which captures internal and external plant operating experience issues, provides reasonable assurance that operating experience will be reviewed in the future to provide objective evidence to support the conclusion that the effects of aging will be adequately managed.

On the basis of its review of the above operating experience on the discussions with the applicant's technical staff, the staff finds that the system walkdown program adequately manages the aging effects that have been observed at the applicant's plant and can do so during the period of extended operation.

UFSAR Supplement

In Appendix A, Section A.2.1.29, of the LRA, the applicant provided the UFSAR supplement for the system walkdown program and stated that the program conducts inspections to manage loss of material, loss of mechanical closure integrity, and cracking, as applicable, for SCs within the scope of license renewal. The program uses general visual inspections of readily accessible system and component surfaces during system walkdowns. The staff reviewed this section and verified that the information in the UFSAR supplement provides an adequate

summary of the program activities, as identified in the SRP-LR UFSAR supplement table and as required by 10 CFR 54.21(d).

Conclusions

On the basis of its review and audit of the applicant's program, the staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.3.10 Wall Thinning Monitoring Program

Summary of Technical Information in the Application

The applicant's wall thinning monitoring program is described in LRA Section B.1.29, "Wall Thinning Monitoring." In the LRA, the applicant stated that the program is plant-specific and is credited with ensuring that wall thickness is above the minimum required in order to avoid failures under normal, transient, and accident conditions, including seismic events.

Staff Evaluation

In accordance with 10 CFR 54.21(a)(3), the staff reviewed the information included in Appendix B, Section B.1.19, of the LRA, regarding the applicant's demonstration of the wall thinning monitoring program to ensure that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB throughout the period of extended operation.

The staff reviewed the wall thinning monitoring program against the AMP elements found in the SRP-LR, Appendix A, Section A.1.2.3, and SRP-LR, Table A.1-1 and focused on how the program manages aging effects through the effective incorporation of 10 elements (i.e., program scope, preventive actions, parameters monitored or inspected, detection of aging effects, monitoring and trending, acceptance criteria, corrective actions, confirmation process, administrative controls, and operating experience.)

The applicant indicated that the corrective actions, confirmation process, and administrative controls are part of the site-controlled quality assurance program. The staff's evaluation of the quality assurance program is provided separately in Section 3.0.4 of this SER. The remaining seven elements are discussed below.

[Scope of Program] The applicant stated, in Appendix B, Section B.1.29, of the LRA, that the wall thinning monitoring program encompasses wall thinning monitoring inspections for carbon and stainless steel components.

The staff confirmed that the program scope program element satisfies the criterion defined in Appendix A.1 of the SRP-LR. The proposed scope identifies the specific components for which the program manages aging. On this basis, the staff finds that the applicant's proposed program scope is acceptable.

[Preventive Actions] The applicant stated the wall thinning monitoring program is an inspection program and no actions will be taken as part of this program to prevent or mitigate degradation due to aging.

The staff confirmed that the preventive actions program element satisfies the criterion defined in Appendix A.1 of the SRP-LR. The staff did not identify the need for preventive actions for the wall thinning monitoring program since it is a condition monitoring program.

[Parameters Monitored] The applicant stated that non-destructive examinations will be performed on susceptible components to determine wall thickness.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. During the audit, the staff observed that the applicant did not identify the parameters monitored nor the type of non-destructive examinations to be performed. By letter dated January 22, 2004, the applicant stated that the wall thinning program was modified to identify that the parameter monitored will be wall thickness. In its letter, the applicant also stated that the wall thinning program was modified to reflect that non-destructive examinations using industry-accepted methods such as ultrasonic testing will be performed on susceptible components to determine wall thickness. The parameters monitored or inspected program element is acceptable because the measurements of wall thickness are intended to detect the presence and extent of aging effects. On this basis, the staff finds that the parameters monitored or inspected is acceptable.

[Detection of Aging Effects] The applicant stated that (1) the aging effect being managed by this program is loss of material. An appropriate sample size will be determined based on operating experience prior to these inspection activities. The extent and schedule of the examinations prescribed by the program will be designed to ensure that aging effects will be discovered and repaired before loss of intended function and (2) inspections will be performed periodically at a frequency to be determined prior to implementation. The frequency of inspections will depend upon results of previous inspections, calculated rate of material loss, and industry and plant operating experience.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. However, the staff observed that applicant did not specify the type of non-destructive examinations to be performed. By letter dated January 22, 2004, the applicant stated that the wall thinning program was modified to reflect that non-destructive examinations using industry-accepted methods such as ultrasonic testing will be performed on susceptible components to determine wall thickness. The staff finds, based on its review of the detection of aging effects program element and the applicant's January 22, 2004 letter, that the detection of aging effects program element is acceptable because the inspections will be developed, using a frequency and sample size based on operating experience, to detect the presence and extent of aging effects. With this additional information the staff finds that the criteria of SRP-LR Appendix A.1 are satisfied and so the program element is acceptable.

[Monitoring and Trending] The applicant stated that wall thickness will be trended and projected to the next inspection, and corrective actions will be taken if the projections indicate that the acceptance criteria of minimum wall thickness may not be met at the next inspection.

The staff confirmed that this program element satisfies the criteria defined in Appendix A of the

SRP-LR. Trending of the inspection results will enhance the applicant's ability to detect aging effects before there is a loss of intended function. On this basis, the staff finds that the monitoring and trending is acceptable.

[Acceptance Criteria] The applicant stated that wall thickness measurements greater than minimum wall thickness values for the components' design code of record will be acceptable.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. The staff finds that any wall thickness values that are projected to fall below the minimum allowable, as determined by the applicable design code, will be found unacceptable and corrective measures implemented. On this basis, the staff finds that the acceptance criteria is acceptable.

[Operating Experience] The applicant stated, in Appendix B, Section B.1.29, of the LRA, that wall thinning monitoring program is a new program for which there is no operating experience.

The staff observed that ultrasonic wall thickness examinations are consistent with industry standards and the applicant had indicated that if initial or periodic examinations reveal the need to expand the sample size or increase the frequency of these activities, such actions would occur. The operating experience associated with the wall thinning monitoring program will be accrued over the period of extended operation.

During the audit, the staff asked the applicant to clarify and/or provide the operating experience reviews for new programs. In its response, the applicant stated that the plant corrective action program, which captures internal and external plant operating experience issues, provides reasonable assurance that operating experience will be reviewed and incorporated in the future to provide objective evidence to support the conclusion that the effects of aging will be adequately managed.

The staff agrees that even though limited operating experience was available, the wall thinning program provides reasonable assurance that the applicable aging effects would be adequately managed for the period of extended operation.

UFSAR Supplement

In Appendix A, Section A.2.1.30, of the LRA, the applicant provided the UFSAR supplement for the wall thinning monitoring program and stated that it will manage loss of material from components, as applicable, within the scope of license renewal. Inspections will be performed to ensure wall thickness is above the minimum required in order to avoid failures. The applicant stated in Appendix A that the wall thinning monitoring program will be initiated prior to the period of extended operation. The staff reviewed this section and verified that the information in the UFSAR supplement provides an adequate summary of the program activities, as identified in the SRP-LR UFSAR supplement table and as required by 10 CFR 54.21(d).

Conclusions

On the basis of its review and audit of the applicant's program, the staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as

required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.3.11 Auxiliary Systems Water Chemistry Control Program

Summary of Technical Information in the Application

The applicant's auxiliary systems water chemistry control program is described in LRA Section B.1.30.1, "Auxiliary Systems Water Chemistry Control." In the LRA, the applicant stated that the program is plant-specific and is credited with managing loss of material, cracking, and fouling of components exposed to treated water environments.

Staff Evaluation

In accordance with 10 CFR 54.21(a)(3), the staff reviewed the information included in Appendix B, Section B.1.30.1, of the LRA, regarding the applicant's demonstration of the auxiliary systems water chemistry control program to ensure that the effects of aging, as discussed above, will be adequately managed so that the intended functions will be maintained consistent with the CLB throughout the period of extended operation.

The staff reviewed the auxiliary systems water chemistry control program against the AMP elements found in the SRP-LR, Appendix A, Section A.1.2.3 and SRP-LR Table A.1-1 and focused on how the program manages aging effects through the effective incorporation of 10 elements (i.e., program scope, preventive actions, parameters monitored or inspected, detection of aging effects, monitoring and trending, acceptance criteria, corrective actions, confirmation process, administrative controls, and operating experience.)

The applicant indicated that the corrective actions, confirmation process, and administrative controls are part of the site-controlled quality assurance program. The staff's evaluation of the quality assurance program is provided separately in Section 3.0.4 of this SER. The remaining seven elements are discussed below.

[Scope of Program] The applicant stated, in Appendix B, Section B.1.30.1, of the LRA, that the auxiliary systems water chemistry control program encompasses sampling activities that include analyses on the EDG and AAC diesel generator cooling water systems. In addition, the program includes chemistry monitoring and inspection activities on selected systems included in the scope of license renewal due to possible spatial interactions with safety-related systems. These are systems containing treated water that are not covered by other chemistry programs.

The applicant stated that LRA Section 2.3.3.11 contains the non-safety-related SCs. In Section 2.3.3.11 of the LRA, the applicant described the systems that are in-scope for 10 CFR 54.4(a)(2). Specifically, LRA Table 2.3.3-11, "Miscellaneous Systems in scope for 10 CFR 54.4(a)(2) Components Subject to Aging Management Review," described non-safety-related system components. LRA Table 3.3.2-11, "Miscellaneous Systems in scope for 10 CFR 54.4(a)(2) Summary of Aging Management Evaluation," identifies component types that credit the auxiliary systems water chemistry control program as an AMP.

The staff confirmed that the program scope program element satisfies the criterion defined in

Appendix A.1 of the SRP-LR. The proposed scope identifies the specific components for which the program manages aging. On this basis, the staff finds that the applicant's proposed program scope is acceptable.

[Preventive Actions] The applicant stated that this program monitors and controls water chemistry in the cooling water systems to manage the effects of aging.

The staff confirmed that the preventive actions program element satisfies the criterion defined in Appendix A.1 of the SRP-LR. On the basis of its audit of the implementation procedures and review of the program basis documents, the staff finds that preventive actions program element is acceptable because it identifies and describes the activities from managing aging effects.

[Parameters Monitored/Inspected] The applicant stated that the program inspects components for visible corrosion, deposits, structural damage, and biological growth. The systems are inspected when opened for maintenance. The program typically monitors pH, conductivity, solids, hardness, nitrite, freeze point, and biological count.

During its audit, the staff asked the applicant to (1) clarify whether iron and copper are monitored in the applicant's auxiliary systems water chemistry control program, and (2) discuss whether the parameters monitored/inspected under this program are consistent with the industry guidance credited. The applicant stated that iron and copper are monitored under the program, and that the program covers a wide variety of equipment and parameters that are monitored/inspected in accordance with vendor recommendations for the individual components. The component inspections and water chemistry monitoring activities are intended to detect the presence and extent of aging effects.

During its audit, the staff asked the applicant to (1) discuss the systems and components that have been inspected (i.e., scope of inspection) under the auxiliary system water chemistry control program (AMP B.1.30.1) in the past and which systems and components would be inspected during the extended period of operation; and (2) discuss whether any systems covered under this program have never been inspected and whether component failures (e.g., leakage) have occurred in these systems.

In its response dated May 19, 2004, the applicant stated that visual inspections have been performed on components in the emergency diesel generator, condensate storage, feedwater, chilled water, and main steam systems during disassembly for various reasons. A number of components such as piping, tanks, heat exchangers and valves that are managed by the auxiliary systems water chemistry control program have been inspected on both the emergency diesel generators and the AAC diesel generator. Many of the components in these cooling water systems are subject to inspection on a routine basis and, as a result, will be inspected during the period of extended operation.

In its response dated May 19, 2004 to the second question above, the applicant stated that during operation, all systems with components that rely only on the auxiliary systems water chemistry control program for managing aging effects have been inspected during maintenance. If leakage were to occur in a system covered by this program, it would have been opened during maintenance to repair the leak and, therefore, would have been inspected.

On the basis of its review of the applicant's responses, the staff confirmed that this program

element satisfies the criteria defined in Appendix A.1 of the SRP-LR and finds that the parameters monitored or inspected program element is acceptable.

[Detection of Aging Effects] The applicant stated that this program manages aging effects in the systems included in the scope.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. In its engineering report, the applicant stated that the aging effects being managed include loss of material (including that due to selective leaching) from the components containing treated water in the emergency diesel generator system; fouling of the heat exchanger tubes of the emergency diesel generator system; loss of material (including that due to selective leaching) from the alternate AC diesel generator components exposed to treated water; fouling on the heat exchanger tubes of the alternate AC diesel generator system; and loss of material and cracking for certain systems containing treated water. The staff reviewed the engineering report, and finds that the component inspections are conducted to detect the presence and extent of aging effects. On this basis, the staff finds that the detection of aging effects program element is acceptable.

[Monitoring and Trending] The applicant stated that values from analyses are archived for long-term trending and review.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. Trending of the inspection results will enhance the applicant's ability to detect aging effects before there is a loss of intended function. On this basis, the staff finds that the monitoring and trending are acceptable.

[Acceptance Criteria] The applicant stated that the acceptance criteria for chemistry parameters are in accordance with the manufacturer's recommendations or industry guidance. The acceptance criteria for visual inspections are satisfactory general cleanliness and no unacceptable corrosion, deposits, or structural damage.

The staff confirmed that this program element satisfies the criteria defined in Appendix A.1 of the SRP-LR. The staff finds that any inspection results that indicate component degradation or any chemistry parameters that fall outside those contained in applicable industry and manufacturers' guidelines will be found unacceptable and corrective measures implemented.

During the audit, the staff asked the applicant to identify specific industry guidance documents used as the basis for the acceptance criteria.

In its response dated May 19, 2004, the applicant replied that EPRI TR-107396 was used to develop the auxiliary systems water chemistry control program and implementing procedure 1052.027. The applicant further stated that more specific guidance was also used to develop the program, including EPRI NP-5569, "Chromate Substitutes for Corrosion Inhibitors in Cooling Systems"; CE-NPSD-448, "Review of Inhibitors used in Closed Cycle Cooling Water Systems"; EPRI TR-105504, "Primer on Maintaining the Integrity of Water-Cooled Generator Stator Windings"; and the Technical Manual for Alternate AC Diesel Generator System.

On the basis of the applicant's response to the above question and its review, the staff finds the acceptance criteria acceptable.

[Operating Experience] The applicant stated that during the review of the ANO-1 LRA (0CNA040109), the NRC staff reviewed the ANO auxiliary systems water chemistry control program. The governing procedure for the auxiliary systems water chemistry program applies to both units.

The staff asked the applicant to discuss whether there have been any condition reports or licensee event reports related to chemical excursions or component degradation occurring in the systems within the scope of the auxiliary systems water chemistry control program. The applicant responded that the operating experience discussed in its engineering report included a review of condition reports, condition report trending data, and interviews with the applicant's technical staff regarding plant system and program operating experience. The review did not identify any condition reports or licensee event reports related to chemical excursions in the systems covered under this program. Also, the condition report trending data did not identify recurrent component degradation occurring in the systems covered under this program.

On the basis of its review of the above operating experience and on discussions with the applicant's technical staff, the staff concludes that auxiliary systems water chemistry control program adequately manages the aging effects that have been observed at the applicant's plant.

UFSAR Supplement

In Appendix A, Section A.2.1.31, of the LRA, the applicant provided the UFSAR supplement for the water chemistry control – auxiliary systems water chemistry control program and stated that the program manages loss of material, cracking, and fouling, as applicable, of components in the scope of license renewal. The program monitors and controls the relevant chemistry conditions for components exposed to treated water environments.

During the audit, the staff noted that for the water chemistry related systems described in the SRP-LR, Table 3.1-2 and Table 3.3-2, industry guidance and/or reports are identified. The staff requested, in question B.1.30.1-6, that the applicant include in its LRA Section A.2.1.31 specific industry guidance for the auxiliary water chemistry program similar to that in the SRP-LR, Tables 3.1-2 and 3.3-2, or justify not including the industry guidance in this section (RAI B.1.30.1-2).

In its response dated May 19, 2004, the applicant stated that a reference to industry guidance used for the auxiliary systems water chemistry control program will be provided in LRA SAR Section A.2.1.31 and committed to completing this action upon issuance of the renewed license.

The staff asked the applicant to clarify what industry guidance would be referenced. In its subsequent response to the staff's question, by letter dated July 22, 2004, the applicant stated that the auxiliary water systems chemistry control program covers a variety of miscellaneous systems and components using many different references such as EPRI reports, vendor technical manuals, and other industry guidance. Applicable references can change frequently based on industry experience or component replacements.

On the basis of its review of the applicant's response to the above question, the staff finds the applicant's response to be acceptable.

Conclusions

On the basis of its review and audit of the applicant's program, the staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). On the basis of its review of the UFSAR supplement for this AMP, the staff finds that the UFSAR is an open item pending resolution of RAI B.1.30.1-2.

3.0.4 Quality Assurance Program Attributes Integral to Aging Management Programs

<To be provided by DIPM/IEHB>

3.0.4.1 Summary of Technical Information in Application

3.0.4.2 Staff Evaluation

3.0.4.3 Conclusions