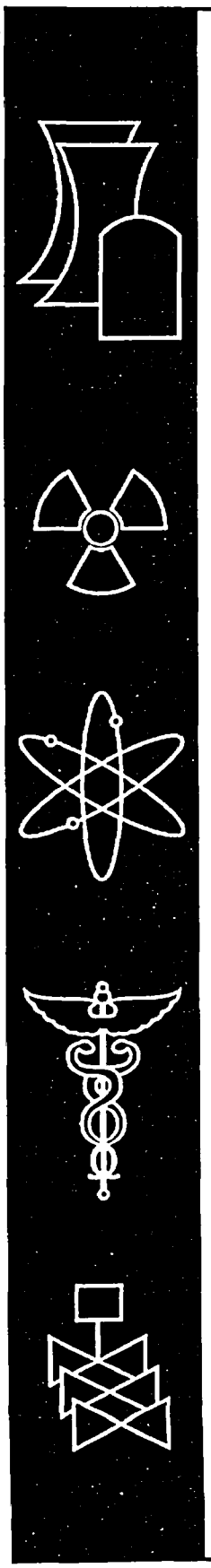
NUREG-1828



Safety Evaluation Report
Related to the License Renewal of the Arkansas Nuclear One, Unit 2

Docket No. 50-368

Entergy Operations, Inc.

U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, DC 20555-0001

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NUREG-1828

Safety Evaluation Report
Related to the License Renewal of the Arkansas Nuclear One, Unit 2

Docket No. 50-368

Entergy Operations, Inc.

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Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
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ABSTRACT

This safety evaluation report (SER) documents the technical review of the Arkansas Nuclear One, Unit 2 (ANO-2), license renewal application (LRA) by the U.S. Nuclear Regulatory Commission staff (staff). By letter dated October 14, 2003, Entergy Operations, Inc. (Entergy or the applicant), submitted the LRA for ANO-2 in accordance with Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54 or the Rule). Entergy is requesting renewal of the operating licenses for ANO-2, (Facility Operating License No. NPF-6) for a period of 20 years beyond the current expiration dates (midnight, July 17, 2018).

The ANO site is located in southwestern Pope County, Arkansas, on a peninsula formed by Lake Dardanelle. The NRC issued ANO-2 construction permit on December 6, 1972. The operating license were issued by the NRC on September 1, 1978. ANO-2 consists of a Combustion Engineering pressurized water reactor unit licensed to generate 3026 megawatts-thermal (MWt), or approximately 1023 megawatts-electric (MWe).

This SER presents the staff's review of information submitted to the NRC in the application. The staff's conclusion of its review of the ANO-2 LRA can be found in Section 6 of this SER.

The NRC ANO-2 license renewal project manager is Mr. Gregory F. Suber. Mr. Suber may be reached at 301-415-1124. Written correspondence should be addressed to the License Renewal and Environmental Impacts Program, U.S. Nuclear Regulatory Commission, Washington, DC 20555-001.

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ABBREVIATIONS

AAC	alternate alternating current
ACI	American Concrete Institute
ACRS	Advisory Committee on Reactor Safeguards
AERM	aging effect requiring management
AFW	auxiliary feedwater
AMP	aging management program
AMR	aging management review
ANO	Arkansas Nuclear One
ANO-1	Arkansas Nuclear One, Unit 1
ANO-2	Arkansas Nuclear One, Unit 2
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATWS	anticipated transient without scram
AWWA	American Water Workers Association
B&PV	Boiler and Pressure Vessel
BAC	boric acid corrosion
BL	Bulletin
BTP	Branch Technical Position
BWR	boiling-water reactor
CASS	cast austenitic stainless steel
CCW	component cooling water
CE	Combustion Engineering
CEA	control element assembly
CEDM	control element drive mecanism
CEOG	Combustion Engineering Owners Group
CFR	Code of Federal Regulations
CI	confirmatory item
CLB	current licensing basis
CMAA	Crane Manufacturers Association of America
CR	condition report
CRD	control rod drive
CS	containment spray
CSB	core support barrel
CUF	cumulative usage factor
C_VUSE	charpy upper-shelf energy
CVCS	chemical and volume control system
DBA	Design-Basis Accident
DBD	design basis document
DC	direct current

ECCS	emergency core cooling system
ECP	emergency cooling pond
EDG	emergency diesel generator
EFPY	effective full-power year
EFW	emergency feedwater
EOL	end of life
EPRI	Electric Power Research Institute
EQ	environmental qualification
ESF	engineering safety feature
FAC	Flow-accelerated corrosion
FAP	fuel assembly plate
FIV	flow-induced vibration
FMP	fatigue monitoring program
FP	Fire Protection
FSAR	Final Safety Analysis Report
FW	Feedwater
GALL	Generic Aging Lessons Learned
GDC	general design criterion
GEIS	Generic Environmental Impact Statement
GL	generic letter
GSI	generic safety issue
HAZ	heat-affected zone
HELB	high-energy line break
HPSI	high pressure safety injection
HVAC	heating, ventilation, and air conditioning
HX	heat exchanger
I&C	instrumentation and controls
IASCC	irradiation-assisted stress corrosion cracking
ICI	in-core instrumentation
IGA	intergranular attack
ISG	interim staff guidance
IGSCC	inter-granular stress corrosion cracking
IN	information notice
IPA	integrated plant assessment
ISG	interim staff guidance
ISI	inservice inspection
kV	kilo-volt
KW	kilo-watt
LBB	leak before break
LOCA	loss of coolant accident
LOSP	loss of offsite power
LPSI	low pressure safety injection
LR	license renewal

LRA	license renewal application
LTOP	low-temperature overpressure protection
LWR	light water reactor
MCL	main coolant line
MeV	mega-electron volt
MIC	microbiologically influenced corrosion
MNSA	mechanical nozzle seal assemblies
MRP	Material Reliability Program
MRV	minimum required values
MSIS	main steam isolation signal
MWe	megawatts-electric
MWt	megawatts-thermal
NDE	non-destructive testing
NEI	Nuclear Energy Institute
NESC	National Electric Safety Code
NFPA	National Fire Protection Association
NPS	nominal pipe size
NRC	U. S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
NSSS	nuclear steam supply system
NUREG	NRC technical report designation (Nuclear Regulatory Commission)
ODSCC	outside-diameter stress corrosion cracking
P&ID	piping and instrumentation diagram
pH	potential hydrogen
ppm	parts-per-million
PSPM	periodic surveillance and preventive maintenance
P-T	pressure-temperature
PTS	pressurized thermal shock
PVC	polyvinyl chloride
PWR	pressurized-water reactor
PWSCC	primary water stress corrosion cracking
RAI	request for additional information
RBHV	reactor building heating and ventilation
RCP	reactor coolant pump
RCPB	reactor coolant pressure boundary
RCS	reactor coolant system
RFO	refueling outage
RG	regulatory guide
RHR	residual heat removal system
RI-ISI	risk-informed inservice inspection
RTD	resistance temperature detector
RTPTS	reference temperature (pressurized thermal shock)
RV	reactor vessel
RVH	reactor vessel head

RVI	reactor vessel internals
RVID	reactor vessel integrity database
RWT	refueling water tank
RPV	reactor pressure vessel
RT_{NDT}	nil-ductility reference temeprature
SAR	safety analysis report
SBO	station blackout
SCC	stress corrosion cracking
SER	safety evaluation report
SFP	spent fuel pool
SG	steam generator
SIAS	safety injection actuation signal
SRP	standard review plan
SS	stainless steel
SSC	system, structure, and component
SW	service water
TLAA	time-limited aging analysis
TS	technical specifications
TSP	trisodium phosphate
UFSAR	updated final safety analysis report
UGS	upper guide structure
USE	upper-shelf energy
VCT	volume control tank
VHP	vessel head penetration

1. INTRODUCTION AND GENERAL DISCUSSION

1.1 Introduction

This document is a safety evaluation report (SER) on the application for license renewal for Arkansas Nuclear One, Unit 2 (ANO-2), as filed by Entergy Operations, Inc. (Entergy, or the applicant). By letter dated October 14, 2003, Entergy submitted its application to the U.S. Nuclear Regulatory Commission (NRC, or the Commission) for renewal of the ANO-2 operating license for up to an additional 20 years. The NRC staff prepared this report, which summarizes the results of the staff's safety review of the renewal application for compliance with the requirements of Title 10, Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," of the *Code of Federal Regulations* (10 CFR Part 54), also known as the License Renewal Rule or Rule. The NRC project manager for the ANO-2 license renewal review is Gregory Suber. Mr. Suber may be contacted by calling 301-415-1124, e-mailing GXS@nrc.gov, or writing to the License Renewal and Environmental Impacts Program, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

In its October 14, 2003, submittal letter, the applicant requested renewal of the operating license issued under Section 103 of the Atomic Energy Act of 1954, as amended (Facility Operating License Number NPF-6) for a period of 20 years beyond the current license expiration date of midnight, July 17, 2018. The ANO site is located in southwestern Pope County, Arkansas, on a peninsula formed by Lake Dardanelle. The NRC issued the ANO-2 construction permit on December 6, 1972, and the operating license on September 1, 1978. The ANO-2 plant consists of a Combustion Engineering (CE) pressurized-water reactor (PWR) unit licensed to generate 3026 megawatts-thermal (MWt), or approximately 1023 megawatts-electric (MWe). The updated final safety analysis report (UFSAR) contains details concerning the plant and the site.

The license renewal process consists of two concurrent reviews, including a technical review of safety issues and an environmental review. The NRC regulations in 10 CFR Parts 54 and 51, respectively, provide the requirements for these reviews. The NRC bases the safety review for the ANO-2 license renewal on the applicant's license renewal application (LRA) and on the responses to requests for additional information (RAIs) from the staff. The applicant supplemented its responses to the LRA and RAIs during audits, meetings, and in docketed correspondence. Unless otherwise noted, the staff reviewed and considered information the applicant submitted through February 28, 2005, which includes all the information submitted in support of the LRA. The LRA and all pertinent information and materials, including the UFSAR mentioned above, are available to the public for review at the NRC Public Document Room, 11555 Rockville Pike, Room O1-F21, Rockville, Maryland (301-415-4737/800-397-4209), or at Ross Pendergraft Library and Technology Center at Arkansas Tech University in Russellville, Arkansas. Materials related to the LRA are also available through the NRC's Web site, at http://www.nrc.gov.

This SER summarizes the results of the staff's safety review of the ANO-2 LRA and delineates the scope of the technical details the staff considered in evaluating the safety aspects of its proposed operation for up to an additional 20 years beyond the term of the current operating license. The staff reviewed the LRA in accordance with NRC regulations and the guidance

provided in NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants," (SRP-LR) issued July 2001.

Sections 2 through 4 of this SER address the staff's evaluation of license renewal issues that it considered during the review of the application. Section 5 is reserved for the report of the Advisory Committee on Reactor Safeguards (ACRS). Section 6 of this SER addresses the conclusions of this report.

Appendix A to this SER provides a table that identifies the applicant's commitments associated with renewing the operating license. Appendix B provides a chronology of the NRC's and the applicant's principal correspondence related to the review of the application. Appendix C lists the principal contributors to the SER. Appendix D presents a list of the references. Appendix E presents an index of the staff's RAIs and the applicant's responses.

In accordance with 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," the staff will prepare a draft for comment and a final, plant-specific supplement to the generic environmental impact statement (GEIS) that discusses the environmental considerations related to renewing the license for ANO-2. The NRC issued NUREG-1437, Supplement 19, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Regarding Arkansas Nuclear One, Unit 2, Draft Report," in September 2004.

1.2 License Renewal Background

Pursuant to the Atomic Energy Act of 1954, as amended, and NRC regulations, the NRC issues licenses to operate commercial power reactors for 40 years. It is possible to renew these licenses for up to 20 additional years. The original 40-year license term was selected on the basis of economic and antitrust considerations, not because of technical limitations. However, some individual plant and equipment designs may have been engineered on the basis of an expected 40-year service life.

In 1982, the NRC held a workshop on nuclear power plant aging, in anticipation of interest in license renewal. That workshop led the NRC to establish a comprehensive program plan for nuclear plant aging research. On the basis of the results of that research, a technical review group concluded that many aging phenomena are readily manageable and do not pose technical issues that would preclude life extension for nuclear power plants. In 1986, the NRC published a request for comment on a policy statement that would address major policy, technical, and procedural issues related to license renewal for nuclear power plants.

In 1991, the NRC published the License Renewal Rule in 10 CFR Part 54. The NRC participated in an industry-sponsored demonstration program to apply the Rule to a pilot plant and to develop experience for establishing implementation guidance. To establish a scope of review for license renewal, the Rule defined age-related degradation unique to license renewal. However, during the demonstration program, the NRC found that many aging mechanisms occur and are managed during the period of the initial license. In addition, the NRC found that the scope of the review did not allow sufficient credit for existing programs, particularly the implementation of the Maintenance Rule, which also manages plant aging phenomena. As a result, the NRC amended the License Renewal Rule in 1995. The amended 10 CFR Part 54

established a regulatory process that is simpler, more stable, and more predictable than the previous License Renewal Rule. In particular, the NRC amended 10 CFR Part 54 to focus on managing the adverse effects of aging rather than on identifying age-related degradation unique to license renewal. The NRC intended that the Rule changes would ensure that important structures, systems, and components (SSCs) will continue to perform their intended functions during the period of extended operation. In addition, the NRC clarified and simplified the integrated plant assessment (IPA) process to be consistent with the revised focus on passive, long-lived structures and components (SCs).

In parallel with these efforts, the NRC pursued a separate rulemaking effort and developed 10 CFR Part 51 to focus the scope of the review of environmental impacts of license renewal, in order to fulfill the NRC's responsibilities under the National Environmental Policy Act of 1969 (NEPA).

1.2.1 Safety Review

The NRC bases license renewal requirements for power reactors on the following two key principles:

(1) The regulatory process is adequate to ensure that the licensing bases of all currently operating plants provide and maintain an acceptable level of safety, with the possible exception of the detrimental effects of aging on the functionality of certain plant SSCs, and possibly a few other issues related to safety, during the period of extended operation.

(2) The plant-specific licensing basis must be maintained during the renewal term in the same manner, and to the same extent, as during the original licensing term.

In implementing these two principles, 10 CFR 54.4 defines the scope of license renewal as those SSCs (1) that are safety related, (2) whose failure could affect safety-related functions, and (3) that are necessary to demonstrate compliance with the NRC's regulations for fire protection (FP), environmental qualification, pressurized thermal shock, anticipated transients without scram, and station blackout (SBO).

Pursuant to 10 CFR 54.21(a), an applicant for a renewed license must review all SSCs within the scope of the License Renewal Rule to identify SCs subject to an aging management review (AMR). The SCs subject to an AMR are those that perform an intended function without moving parts or without a change in configuration or properties, and that are not subject to replacement based on qualified life or specified time period. As required by 10 CFR 54.21(a), an applicant for a renewed license must demonstrate that the effects of aging will be managed in such a way that the intended function or functions of those SCs will be maintained, consistent with the current licensing basis (CLB), for the period of extended operation. The NRC considers active equipment, however, to be adequately monitored and maintained by existing programs. In other words, the detrimental aging effects that may occur for active equipment are more readily detectable and will be revealed through performance indicators, or the applicant will identify and correct them through routine surveillance and maintenance. The surveillance and maintenance programs for active equipment, as well as other aspects of maintaining the plant design and licensing basis, are required throughout the period of

extended operation. According to 10 CFR 54.21(d), a supplement to the UFSAR must contain a summary description of the programs and activities for managing the effects of aging and the evaluations of time-limited aging analyses for the period of extended operation.

The Rule also requires an applicant to identify and update time-limited aging analyses (TLAAs). During the design phase for a plant, certain assumptions are made about the length of time the plant will operate. These assumptions are incorporated into design calculations for several of the plant's SSCs. In accordance with 10 CFR 54.21(c))(1), the applicant must either show that these calculations will remain valid for the period of extended operation, project the analyses to the end of the period of extended operation, or demonstrate that it will adequately manage the effects of aging on these SSCs for the period of extended operation.

In 2001, the NRC developed and issued Regulatory Guide (RG) 1.188, "Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses." This RG endorses an implementation guideline prepared by the Nuclear Energy Institute (NEI) as an acceptable method for implementing the License Renewal Rule. This guideline is NEI 95-10, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54—The License Renewal Rule," issued in March 2001. The NRC also prepared the SRP-LR, which it used to review this application.

The applicant used the process defined in NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," issued July 2001. The GALL Report provides the staff with a summary of staff-approved aging management programs (AMPs) for the aging of many SCs 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 summarizes the aging management evaluations, programs, and activities credited with managing aging for most of the SCs used throughout the industry. It serves as a reference for both applicants and staff reviewers to quickly identify those AMPs and activities that the staff has determined will adequately manage aging during the period of extended operation.

1.2.2 Environmental Review

Title 10, Part 51, of the *Code of Federal Regulations* (10 CFR Part 51) governs environmental protection regulations. The NRC revised these regulations in December 1996 to facilitate the environmental review for license renewal. The staff prepared a GEIS, in which the staff examined the possible environmental impacts associated with renewing licenses of nuclear power plants. For certain types of environmental impacts, the GEIS establishes generic findings that are applicable to all nuclear power plants. Appendix B to Subpart A of 10 CFR Part 51 identifies these generic findings as Category 1 issues. Pursuant to 10 CFR 51.53(c)(3)(I), an applicant for license renewal may incorporate these generic findings in its environmental report. The applicant must include analyses of those environmental impacts that it must evaluate on a plant-specific basis (Category 2 issues) in the environmental report, in accordance with 10 CFR 51.53(c)(3)(ii).

In accordance with NEPA and the requirements of 10 CFR Part 51, the staff performed a plant-specific review of the environmental impacts of license renewal, including whether there was new and significant information not considered in the GEIS. A public meeting took place on

February 3, 2004, in Russellville, Arkansas, as part of the NRC's scoping process to identify environmental issues specific to the plant. On August 30, 2004, the NRC documented the results of the environmental review (and a preliminary recommendation with respect to the license renewal action) in its draft plant-specific supplement to the GEIS, which was discussed at a separate public meeting held on October 19, 2004, in Russellville, Arkansas. After considering comments on the draft, the NRC will prepare and publish a final plant-specific supplement to the GEIS. These documents are published separate from this SER.

1.3 Principal Review Matters

Title 10, Part 54, of the *Code of Federal Regulations* (10 CFR Part 54) describes the requirements for renewing operating licenses for nuclear power plants. The staff performed its technical review of the ANO-2 LRA in accordance with Commission guidance and the requirements of 10 CFR Part 54. Furthermore, 10 CFR 54.29 describes the standards for renewing a license. This SER describes the results of the staff's safety review.

In 10 CFR 54.19(a), the Commission requires a license renewal applicant to submit general information. The applicant provided this general information in Section 1 of its LRA for ANO-2, submitted by letter dated October 15, 2003. The staff finds that the applicant has submitted the information required by 10 CFR 54.19(a) in Section 1 of the LRA.

In 10 CFR 54.19(b), the Commission requires that LRAs include "conforming changes to the standard indemnity agreement, 10 CFR 140.92, Appendix B, to account for the expiration term of the proposed renewed license." The applicant stated the following in its LRA regarding this issue:

> The current indemnity agreement for ANO-2 states in Article VII that the agreement shall terminate at the time of expiration of the license specified in Item 3 of the Attachment to the agreement, which is the last to expire. Item 3 of the Attachment to the indemnity agreement as revised by Amendment No. 6, lists ANO-2 operating license number NPF-6. Entergy Operations requests that conforming changes be made to Article VII of the indemnity agreement, and Item 3 of the Attachment to that agreement, specifying the extension of agreement until the expiration date of the renewed ANO-2 facility operating license sought in this application. In addition, should the license number be changed upon issuance of the renewal license, Entergy Operations requests that conforming changes be made to Item 3 of the Attachment, and other sections of the indemnity agreement as appropriate.

The staff intends to maintain the license numbers on issuance of the renewed licenses. Therefore, conforming changes to the indemnity agreement are not necessary, and the requirements of 10 CFR 54.19(b) have been met.

In 10 CFR 54.21, the Commission requires that each application for a renewed license for a nuclear facility must contain (1) an IPA, (2) a description of CLB changes during the staff's review of the application, (3) an evaluation of TLAAs, and (4) an UFSAR supplement. Chapters 3 and 4, and Appendices A and B, of the LRA address the license renewal requirements of 10 CFR 54.21(a), (c)), and (d), respectively.

In 10 CFR 54.21(b), the Commission requires that each year following submittal of the application, and at least 3 months before the scheduled completion of the staff's review, the applicant must submit an amendment to the renewal application. In the amendment, the applicant must identify any change to the CLB of the facility that materially affects the contents of the LRA, including the UFSAR supplement.

In accordance with 10 CFR 54.22, an applicant must include in the LRA any technical specification changes or additions necessary to manage the effects of aging during the period of extended operation. In Appendix D to the LRA, the applicant stated that no changes to the ANO-2 technical specifications are necessary. This satisfies the requirement specified in 10 CFR 54.22.

The staff evaluated the technical information required by 10 CFR 54.21 and 10 CFR 54.22, in accordance with the NRC's regulations and the guidance provided by the SRP-LR. Sections 2, 3, and 4 of this SER document the staff's evaluation of the technical information.

The staff will document its evaluation of the environmental information required by 10 CFR 54.23 in the final plant-specific supplement to the GEIS that specifies the considerations related to renewing the license for ANO-2. The staff will prepare this supplement separate from this SER. As required by 10 CFR 54.25, the ACRS will issue a report to document its evaluation of the staff's LRA review and the associated SER. Section 5 of this SER will incorporate this ACRS report. Section 6 of this SER will document the findings required by 10 CFR 54.29.

1.4 Interim Staff Guidance

The license renewal program is a living program. The NRC staff, industry, and other interested stakeholders gain experience and develop lessons learned with each renewed license. The lessons learned are intended to conform to the NRC's performance goals of maintaining safety, improving effectiveness and efficiency, reducing regulatory burden, and increasing public confidence. The NRC documents the lessons learned in interim staff guidance (ISG) documents that it issues to the public for comment, modifies as necessary to resolve comments, reissues in final, and makes available for use by the staff and interested stakeholders until the improved license renewal guidance documents are revised.

The following provides the current set of relevant ISGs that the staff has issued, and the SER sections in which the staff addresses the issues:

ISG Issue (Approved ISG No.)	Purpose	SER Section
How to credit plant programs and activities for license renewal **(ISG-01)**	To clarify that GALL report contains one, though not the only, acceptable way to determine adequacy of plant programs and activities for license renewal	N/A
Station Blackout Scoping **(ISG-2)**	The License Renewal Rule, at 10 CFR 54.4(a)(3), includes 10 CFR 50.63(a)(1) (SBO). The SBO rule requires that a plant must withstand and recover from an SBO event. The recovery time for offsite power is much faster than that of emergency diesel generators. The offsite power system should be included within the scope of license renewal.	2.5.2 3.6.2.3.1
Concrete Aging Management Program **(ISG-3)**	Lessons learned from the GALL demonstration project indicate that the GALL Report is not clear whether concrete needs any AMPs.	3.5.2.2 3.5.2.3.1

ISG Issue (Approved ISG No.)	Purpose	SER Section
Fire Protection System Piping (ISG-4)	The ISG clarifies the staff position for wall thinning of FP piping system in GALL AMPs XI.M26 and XI.M27. The new position states that there is no need to disassemble FP piping, as oxygen can be introduced in the FP piping which can accelerate corrosion. Instead, licensees should use a nonintrusive method, such as volumetric inspection. Licensees should test the sprinkler heads every 50 years and 10 years after initial service. The ISG eliminates Halon/carbon dioxide system inspections for charging pressure, valve lineups, and automatic mode of operation test from the GALL Report, as the staff considers these test verifications to be operational activities.	3.0.3.2.4

ISG Issue (Approved ISG No.)	Purpose	SER Section
Identification and Treatment of Electrical Fuse Holders **(ISG-5)**	The ISG includes the fuse holder AMR and AMP (i.e., same as terminal blocks and other electrical connections). The position includes only fuse holders that are not inside the enclosure of active components (e.g., inside of switchgears and inverters). Operating experience finds that metallic clamps (spring-loaded clips) have a history of age-related failures from aging stressors such as vibration, thermal cycling, mechanical stress, corrosion, and chemical contamination. The staff finds that visual inspection of fuse clips is not sufficient to detect the aging effects from fatigue, mechanical stress, and vibration.	3.6.2.4.5
The ISG Process **(ISG-8)**	To update and establish the interim staff guidance process.	N/A
License Renewal Application Format **(ISG-10)**	To standardize license renewal application format for 2003 applicants	N/A
Environmental Fatigue for Carbon/Low-Alloy Steel **(ISG-11)**	To review the aging management of environmental fatigue in the ISG process, as agreed at September 18, 2002, meeting	N/A

1.5 Summary of Open Items

Open items are items for which the applicant has not presented a sufficient basis for resolution. The draft SER was issued on November 5, 2004 with no open items. No subsequent open items were identified in the preparation of the final SER.

1.6 Summary of Confirmatory Items

Confirmatory items are items for which the staff and the applicant have reached a satisfactory resolution, but the applicant has not yet formally submitted the resolution to the staff. The draft SER was issued on November 5, 2004 with no confirmatory items. No subsequent confirmatory items were identified in the preparation of the final SER.

1.7 Summary of Proposed License Conditions

As a result of the staff's review of the ANO-2 LRA, including the additional information and clarifications submitted subsequently, the staff identified three proposed license conditions.

The first license condition requires the applicant to include the FSAR Supplement required by 10 CFR 54.21(d) in the next FSAR update required by 10 CFR 50.71(e) following the issuance of the renewed license.

The second license condition requires that the future activities identified in the FSAR Supplement be completed prior to entering the period of extended operation.

The third license condition is as follows:

> All capsules in the reactor vessel that are removed and tested must meet the test procedures and reporting requirements of ASTM E 185-82 to the extent practicable for the configuration of the specimens in the capsule. Any changes to the capsule withdrawal schedule, including spare capsules, must be approved by the NRC prior to implementation. All capsules placed in storage must be maintained for future insertion.

2. STRUCTURES AND COMPONENTS SUBJECT TO AGING MANAGEMENT REVIEW

2.1 Scoping and Screening Methodology

2.1.1 Introduction

In Title 10, Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," of the *Code of Federal Regulations*, (10 CFR Part 54), also referred to as the Rule, 10 CFR 54.21, "Contents of Application—Technical Information," requires that each application for license renewal contain an integrated plant assessment (IPA). Furthermore, the IPA must list and identify those structures and components (SCs) that are subject to an aging management review (AMR) from the structures, systems, and components (SSCs) that are within the scope of license renewal, in accordance with 10 CFR 54.4.

In Section 2.1, "Scoping and Screening Methodology," of the license renewal application (LRA), the applicant described the scoping and screening methodology used to identify SSCs at Arkansas Nuclear One, Unit 2 (ANO-2), that are within the scope of license renewal and SCs that are subject to an AMR. The staff reviewed the applicant's scoping and screening methodology to determine if it meets the scoping requirements stated in 10 CFR 54.4(a) and the screening requirements stated in 10 CFR 54.21.

In developing the scoping and screening methodology for the ANO-2 LRA, the applicant considered the requirements of the Rule, the Statements of Consideration (SOC) for the Rule, and the guidance presented by the Nuclear Energy Institute (NEI), in NEI 95-10, Revision 3, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54—The License Renewal Rule," issued March 2001. In addition, the applicant also considered the U.S. Nuclear Regulatory Commission (NRC) staff's correspondence with other applicants and with the NEI in the development of this methodology.

2.1.2 Summary of Technical Information in the Application

Sections 2.0 and 3.0 of the LRA provide the technical information required by 10 CFR 54.21(a). In Section 2.1 of the LRA, the applicant described the process used to identify the SSCs that meet the license renewal scoping criteria under 10 CFR 54.4(a), as well as the process used to identify the SCs that are subject to an AMR as required by 10 CFR 54.21(a)(1).

Additionally, Section 2.2, "Plant Level Scoping Results"; Section 2.3, "System Scoping and Screening Results: Mechanical"; Section 2.4, "Scoping and Screening Results: Structures"; and Section 2.5, "Scoping and Screening Results: Electrical and Instrumentation and Control Systems," of the LRA amplify the process that the applicant used to identify the SCs that are subject to an AMR. Chapter 3 of the LRA, "Aging Management Review Results," contains Section 3.1, "Reactor Vessel, Internals and Reactor Coolant System"; Section 3.2, "Engineered Safety Features Systems"; Section 3.3, "Auxiliary Systems"; Section 3.4, "Steam and Power Conversion Systems"; Section 3.5, "Structures and Component Supports"; and Section 3.6, "Electrical and Instrumentation and Controls." Chapter 4 of the LRA, "Time-Limited Aging Analyses," contains the applicant's identification and evaluation of time-limited aging analyses (TLAAs).

2.1.2.1 Scoping Methodology

2.1.2.1.1 Application of the Scoping Criteria in 10 CFR 54.4(a)

In Sections 2.1.1, "Scoping Methodology," and 2.1.1.1, "Application of Safety-Related Scoping Criteria," of the LRA, the applicant discussed the scoping methodology with regard to safety-related criteria in accordance with 10 CFR 54.4(a)(1). With respect to the safety-related criteria, the applicant stated that the SSCs within the scope of license renewal include safety-related SSCs that it identified by a review of plant-specific information to determine if they meet the criteria of 10 CFR 54.4(a)(1).

The applicant maintained a component-level database which identified the component safety classification. The safety-related classification uses the same definition as that stated in 10 CFR 54.4. The ANO-2 definition of safety related used to develop and maintain the component-level Q-list includes the SSCs that are relied on to remain functional during or after design-basis events to ensure the following:

- the integrity of the reactor coolant pressure boundary
- the capability to shut down the reactor and maintain it in a safe-shutdown condition
- the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the guideline exposures of 10 CFR Part 100, "Reactor Site Criteria"

In addition to the guidelines of 10 CFR 100.11, the safety-related criteria of 10 CFR 54.4(a)(1)(iii) includes reference to the dose guidelines of 10 CFR 50.34(a)(1) and 10 CFR 50.67(b)(2).

The LRA indicates that the applicant determined the SSCs which perform safety functions by reviewing the ANO-2 component-level Q-list and the system and structure functions. If one or more of the three criteria were met, the applicant determined the function to be a safety intended function and included the corresponding system or structure within the scope of license renewal as safety related. The applicant used the plant design-basis documents, including the safety analysis report (SAR) and the upper level design documents, to identify the system functions and verify the Q-list identification of safety-related components. The applicant elected to designate some components that do not perform any of the functions of 10 CFR 54.4(a)(1) as safety-related because of plant-specific considerations or preferences. Therefore, certain components may not meet the criteria of 10 CFR 54.4(a)(1), although the component was designated as safety related for plant-specific reasons. The LRA states that very few components meet this exception and notes that the applicant still evaluated the systems and structures containing these components for inclusion in the scope of license renewal using the criteria of 10 CFR 54.4(a)(2) and 10 CFR 54.4(a)(3).

In Sections 2.1.1 and 2.1.1.2, "Application of Criterion for Nonsafety-Related SSCs Whose Failure Could Prevent the Accomplishment of Safety Functions," of the LRA, the applicant discussed the scoping methodology with regard to the nonsafety-related criteria, in accordance with 10 CFR 54.4(a)(2). With respect to the nonsafety-related criteria, the applicant stated, in part, that it performed a review to identify the nonsafety-related SSCs whose failure could

prevent satisfactory accomplishment of the safety-related intended functions identified in 10 CFR 54.4(a)(1).

The LRA states that the applicant identified nonsafety-related SSCs whose failure could prevent satisfactory accomplishment of a safety function. The applicant considered the impacts of nonsafety-related SSC failures as either functional or spatial. In a functional failure, the failure of an SSC to perform its normal function impacts a safety function. In a spatial failure, a safety function is impacted by the loss of structural or mechanical integrity of an SSC in physical proximity to a safety-related component.

Functional Failures of Nonsafety-Related SSCs. The LRA states that, with few exceptions, the applicant classified SSCs as safety related if they are required to perform a function in support of other safety-related components and included them in the scope of license renewal, per 10 CFR 54.4(a)(1). For the few exceptions where nonsafety-related equipment is required to remain functional in support of a safety function, the applicant included the supporting systems within the scope as nonsafety-related SSCs affecting safety-related SSCs. The applicable sections of the SAR, technical specifications, Maintenance Rule scoping documents, and design-basis documents provided the system information to determine the appropriate systems and structures in this category.

The applicant determined that, for piping systems, the nonsafety-related piping and supports, up to and including the first equivalent anchor beyond the safety/nonsafety-related interface, are subject to an AMR. In addition, nonsafety-related portions of safety-related systems downstream of the first anchor are subject to an AMR if they have the potential for spatial interaction with safety-related SSCs.

Spatial Failures of Nonsafety-Related SSCs. The applicant determined that components meeting the scoping criteria of 10 CFR 54.4(a)(2) are either nonsafety-related SSCs directly connected to safety-related SSCs (typically piping systems), or nonsafety-related SSCs with the potential for spatial interaction with safety-related SSCs. The LRA states that protective features (e.g., whip restraints, spray shields, supports, and barriers) were installed to protect safety-related SSCs against spatial interaction with nonsafety-related SSCs. Such protective features credited in the plant design are included within the scope of license renewal and are subject to an AMR. Where those protective features provide adequate protection, the applicant excluded the nonsafety-related system itself from the scope of license renewal. Protective features are typically associated with a structure and are addressed in the structural AMR. The applicant determined that the different modes of spatial interaction include the following:

- The first mode is physical impact. Nonsafety-related supports for nonseismic or seismic Category II/I piping systems with a potential for spatial interaction with safety-related SSCs are subject to an AMR based on the criteria of 10 CFR 54.4(a)(2). These supports are addressed in a commodity fashion within the civil/structural section of the LRA. The LRA states that, based on earthquake experience data that include aged pipe, the following conclusions can be drawn:

  — No experience data exist of welded steel pipe segments falling because of a strong-motion earthquake.

— Falling of piping segments is extremely rare and only occurs when the supports fail. As long as the effects of aging on the supports for piping systems are managed, the applicant did not consider the falling of piping sections to be credible, and the piping section itself is not within scope for 10 CFR 54.4(a)(2) because of the physical impact hazard. Internal or external events, such as failure of rotating equipment, can generate missiles. Inherent nonsafety-related features that protect safety-related equipment from missiles require an AMR based on the criteria in 10 CFR 54.4(a)(2). The overhead-handling systems (i.e., cranes), whose structural failure could result in damage to any system that could prevent the accomplishment of a safety function, meet the criteria of 10 CFR 54.4(a)(2) and are within the scope of license renewal.

- The second mode includes pipe whip, jet impingement, or harsh environments. The LRA states that the site-specific analyses of high-energy line breaks (HELB) and medium-energy line breaks address pipe whip, jet impingement, and harsh environment effects on safety-related equipment. The LRA states that if a HELB analysis assumes that a nonsafety-related piping system does not fail or assumes failure only at specific locations, then that piping system is within the scope of license renewal per 10 CFR 54.4(a)(2) and subject to an AMR. This provides reasonable assurance that those assumptions remain valid through the period of extended operation.

- The third mode includes leakage, spray, or flooding. The LRA states that moderate- and low-energy systems have the potential for spatial interactions of spray and leakage. Nonsafety-related systems and nonsafety-related portions of safety-related systems with the potential for spray or leakage that could prevent safety-related SSCs from performing their required safety function are within the scope of license renewal and subject to an AMR. The LRA states that no credible aging effects of air and gas (nonliquid) systems exist, and they cannot adversely affect safety-related SSCs by leakage or spray. Operating experience indicates that nonsafety-related systems containing only air or gas have experienced no failures from aging that could impact the ability of safety-related equipment to perform required safety functions. These systems are not within the scope of license renewal according to the scoping criteria of 10 CFR 54.4(a)(2).

The LRA states that the applicant considered nonsafety-related systems and nonsafety-related portions of safety-related systems containing steam or liquid that are near safety-related equipment to be within scope and subject to an AMR for 10 CFR 54.4(a)(2). Pressure boundary failures of these systems could result in the nonsafety-related piping spraying or leaking on safety-related equipment. The LRA states that consideration of hypothetical failures that could result from system interdependencies that are not part of the current licensing basis (CLB) and that have not been previously experienced is not required. Long-term exposure to conditions resulting from a failed nonsafety-related SSC (e.g., leakage or spray) is not considered credible. The applicant indicated that operators would detect leakage or spray from liquid-filled low-energy systems during their routine rounds or system walkdowns long before it could impact the performance of safety-related equipment. The LRA states that walls, curbs, dikes, doors, and other structures that provide flood barriers to safety-related SSCs require an AMR based on the criteria of 10 CFR 54.4(a)(2). The applicant included these as part of the building structure and evaluated them in the civil/structural AMR.

In Sections 2.1.1 and 2.1.1.3, "Application of Criterion for Regulated Events," of the LRA, the applicant discussed the scoping methodology as it relates to the regulated event criteria in accordance with 10 CFR 54.4(a)(3). The LRA states that the scope of license renewal includes those SSCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (EQ) (10 CFR 50.49), pressurized thermal shock (PTS) (10 CFR 50.61), anticipated transients without scram (ATWSs) (10 CFR 50.62), and station blackout (SBO) (10 CFR 50.63).

Fire Protection. The LRA states that systems and structures within the scope of license renewal for fire protection include equipment based on functional requirements defined in 10 CFR 50.48 and Appendix R. The SSCs credited with fire prevention, detection, and mitigation in areas containing equipment important to the safe operation of the plant are within scope for license renewal. To establish this scope of equipment, the applicant performed a detailed review of the ANO-2 CLB for fire protection. Based on this review, the applicant determined the intended functions performed in support of 10 CFR 50.48 requirements. The applicant included the SSCs relied on in safety analyses or plant evaluations to perform an intended function and demonstrate compliance with NRC regulations for fire protection within the scope of license renewal, in accordance with the criteria of 10 CFR 54.4(a)(3).

Environmental Qualification. The LRA states that 10 CFR 50.49 defines electric equipment important to safety that is required to be environmentally qualified to mitigate certain accidents that result in harsh environmental conditions in the plant. The LRA states that 10 CFR 50.49 codifies requirements for the EQ of electrical equipment that has been presented in other regulatory documents, such as NRC Office of Inspection and Enforcement (IE) Bulletin 79-01B, and the ANO-2 EQ program satisfies these requirements. The applicant used a bounding scoping approach for electrical equipment. Electrical systems and electrical equipment in mechanical systems, subject to the regulation, are included as within the scope of license renewal. The applicant included the SSCs relied on in safety analyses or plant evaluations to perform an intended function and demonstrate compliance with NRC regulations for EQ within the scope of license renewal, in accordance with the criteria of 10 CFR 54.4(a)(3).

Pressurized Thermal Shock. The LRA states that the rule concerning PTS, 10 CFR 50.61, requires that licensees evaluate the reactor vessel beltline materials against specific criteria to ensure protection from brittle fracture. For ANO-2, the limiting reference temperatures are well below the screening criteria. As a result, no flux reduction programs or modifications to equipment, systems, or operation are necessary to prevent potential failure of the reactor vessels. The only system relied upon to meet the PTS regulation is the reactor coolant system (RCS), which contains the reactor vessel. No structures are relied upon to meet the PTS regulation. The applicant included the SSCs relied on in safety analyses or plant evaluations to perform an intended function and demonstrate compliance with NRC regulations for PTS within the scope of license renewal, in accordance with the criteria of 10 CFR 54.4(a)(3).

Anticipated Transients Without Scram. The LRA states that an ATWS is an anticipated operational occurrence that is accompanied by a failure of the reactor trip system to shut down the reactor. The ATWS rule, 10 CFR 50.62, requires specific improvements in the design and operation of commercial nuclear power facilities to reduce the probability of failure to shut down the reactor following anticipated transients and to mitigate the consequences of an ATWS event. Based on the ANO-2 CLB for ATWS, the applicant determined the intended functions

supporting 10 CFR 50.62 requirements. Since the scope of equipment required by 10 CFR 50.62 extends from sensor output to the final actuation device, the plant systems that support compliance with the ATWS rule are electrical and instrumentation and control (I&C) systems. The applicant used a bounding scoping approach for electrical equipment. Electrical systems are included within the scope of license renewal, and the applicant evaluated the electrical equipment in mechanical systems with the electrical systems. The applicant included the SSCs relied on in safety analyses or plant evaluations to perform an intended function and demonstrate compliance with NRC regulations for ATWS within the scope of license renewal, in accordance with the criteria of 10 CFR 54.4(a)(3).

Station Blackout. According to the LRA, to comply with 10 CFR 50.63, ANO-2 relies upon equipment to ensure the cooling of the reactor core and maintenance of the containment integrity using the station batteries and the alternate alternating current (ac) diesel before offsite or onsite ac power is restored. Based on the review of the ANO-2 current licensing bases for SBO, the applicant identified the equipment performing intended functions required for compliance with 10 CFR 50.63. The applicant included the systems and structures relied upon to restore the offsite ac power (including the onsite portion of the offsite power sources) and onsite ac power within the scope of license renewal for SBO. In addition to the plant electrical systems, certain switchyard components required to restore offsite power are included. The SSCs relied on in safety analyses or plant evaluations to perform an intended function and demonstrate compliance with NRC regulations for SBO are included within the scope of license renewal, in accordance with the criteria of 10 CFR 54.4(a)(3).

2.1.2.1.2 Documentation Sources Used for Scoping and Screening

In Section 2.1.1 of the LRA, the applicant stated that it reviewed information derived from the applicable sections of the SAR, technical specifications, Maintenance Rule scoping documents, upper level documents, and ANO topical reports for the NRC regulations identified in 10 CFR 54.4(a)(3) during the license renewal scoping and screening process. The applicant used this information to identify the functions performed by plant systems and structures. The applicant then compared these functions with the scoping criteria in 10 CFR 54(a)(1–3) to determine if the associated plant system or structure performs a license renewal intended function. The applicant also used these sources develop the list of SSCs subject to an AMR.

2.1.2.2 Screening Methodology

Following the determination of SSCs within the scope of license renewal, the applicant implemented a process for determining which SCs are subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1). In Section 2.1.2, "Screening Methodology," of the LRA, the applicant discussed these screening activities as they relate to the SCs that are within the scope of license renewal.

2.1.2.2.1 Mechanical Component Screening Methodology

Following component-level scoping for mechanical systems, the applicant performed screening to identify those mechanical components that are subject to an AMR. The applicant stated in LRA Section 2.1.2.1, "Screening of Mechanical Systems," that within the system, long-lived passive components that perform or support an intended function without moving parts or a change in configuration or properties are subject to an AMR. In the case of valves, pumps, and

housings for fans and dampers, the applicant determined the valve bodies, pump casings, and housings that perform an intended function by maintaining the pressure boundary and are therefore subject to an AMR.

If the component is not subject to replacement based on qualified life or specified time period, the applicant considered it to be long-lived. Replacement programs are based on vendor recommendations, plant experience, or other means that establish a specific service life, qualified life, or replacement frequency under a controlled program. The applicant did not include components that are not long-lived in the AMR.

2.1.2.2.2 Structural Component Screening Methodology

Following component-level scoping for structures, the applicant performed screening to identify those civil/structural components that are subject to an AMR. In LRA Section 2.1.2.2, "Screening of Structures," the applicant described the methodology used to screen civil/structural components.

The LRA states that for each structure within the scope of license renewal, the applicant evaluated the structural components and commodities to determine those subject to an AMR. The screening process for structural components and commodities involved a review of design-basis documents to identify specific structural components and commodities that constitute the structure. Structural components or commodities subject to an AMR are those that perform an intended function without moving parts or a change in configuration or properties (i.e., passive), and are not subject to replacement based on qualified life or specified time period (i.e., long-lived). Since structures are inherently passive, and with few exceptions are long-lived, the screening of structural components and commodities was based primarily on whether they perform an intended function.

Structural Component and Commodity Groups. The LRA states that structural components and commodities often have no unique identifiers, such as those given to mechanical components. Therefore, grouping structural components and commodities based on materials of construction provides a practical means of categorizing them for AMRs. The applicant categorized structural components and commodities according to the following groups, based on materials of construction:

- steel
- threaded fasteners
- concrete
- fire barriers
- elastomers
- earthen structures
- Teflon

Evaluation Boundaries. The applicant generally categorized structural components and commodities that are attached to a structure or reside within a structure as either component supports or other structural members:

- The applicant established the evaluation boundaries for mechanical component supports in accordance with rules governing inspection of component supports (i.e.,

American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, Subsection IWF). Article IWF-3100, Figure IWF-1300-1, defines component support examination boundaries for integral and nonintegral (i.e., mechanically attached) supports. In general, the support boundary extends to the surface of the building structure but does not include the building structure. Furthermore, the support boundary extends to include nonintegral attachments to piping and equipment but excludes integral attachments to the same.

- Supports for electrical components include cable trays and conduit supports, electrical panels, racks, cabinets, and other enclosures. The evaluation boundary for these items includes supporting elements, such as mechanical or integral attachments to the building structure.

- Evaluation boundaries for other structural members which carry dynamic loads caused by postulated design-basis events are consistent with the method for establishing boundaries for supports specified above. That is, the boundary includes the structural component and the associated attachment to the building structure. The applicant considered the portion of the attachment embedded in the building structure as part of the structure.

Intended Function. The applicant evaluated structural components and commodities to determine intended functions as they relate to license renewal. Unlike mechanical equipment for which both system-level and component-level intended functions are defined, the intended functions for structures are typically based on a simple set of functions that apply both to the structure and to its components and commodities. NEI 95-10 provides guidelines for determining the intended functions of structures, structural components, and commodities for purposes of license renewal.

2.1.2.2.3 Electrical/Instrumentation and Control Component Screening Methodology

Following system-level scoping, the applicant performed screening to identify those electrical/I&C components that are subject to an AMR. In LRA Section 2.1.2.3, "Electrical and Instrumentation and Control Systems," the applicant described the methodology used to screen civil/structural components.

Passive Screening. The LRA states that Appendix B, "Typical Structure, Component and Commodity Groupings and Active/Passive Determinations for the Integrated Plant Assessment," to NEI 95-10 identifies electrical commodities considered to be passive. The applicant identified and cross-referenced the ANO-2 electrical commodity groups to the appropriate NEI 95-10 commodity, which identified the passive commodity groups.

The applicant identified two passive electrical and I&C commodity groups that meet the 10 CFR 54.21(a)(1)(I) criterion (i.e., components that perform an intended function without moving parts or without a change in configuration):

(1) cables and connections, bus, and electrical portions of electrical and I&C penetration assemblies

(2) high-voltage insulators

The applicant considered the pressure boundary function that may be associated with some electrical and I&C components identified in Appendix B to NEI 95-10 (e.g., flow elements, vibration probes) in the mechanical AMRs, as applicable. In addition, electrical components which are supported by structural commodities (e.g., cable trays, conduit and cable trenches) are included in the structural AMRs.

Long-Lived Screening. The LRA states that electrical components included in the Environmental Qualification Program per 10 CFR 50.49 are replaced based on qualified life and, therefore, do not meet the long-lived criterion of 10 CFR 54.21(a)(1)(ii) and are not subject to an AMR. Some insulated cables and connections and most electrical penetration assemblies are included in the Environmental Qualification Program and are not subject to an AMR. The applicant did not screen out any other passive, non-EQ electrical components per the long-lived criterion; therefore, they are subject to an AMR.

2.1.3 Staff Evaluation

As part of its review of the applicant's LRA, the NRC staff evaluated the scoping and screening activities described in Section 2.1 to ensure that the applicant described a process for identifying SSCs that are within the scope of license renewal, in accordance with the requirements of 10 CFR 54.4(a)(1–3). The staff evaluated Sections 2.2, 2.3, 2.4, and 2.5 to assure that the applicant described a process for determining structural, mechanical, and electrical components at ANO-2 that are subject to an AMR for license renewal, in accordance with the requirements of 10 CFR 54.21(a)(1–2).

In addition, the staff conducted a scoping and screening methodology audit at ANO-2 from January 20–23, 2004. The results of the audit were documented in the ANO-2 Trip Report issued on October 7, 2004 (ML0428104440). The audit focused on ensuring that the applicant developed and implemented adequate guidance to conduct the scoping and screening of SSCs in accordance with the methodologies described in the application and the requirements of the Rule. The audit team reviewed implementation procedures and engineering reports which describe the scoping and screening methodology implemented by the applicant. In addition, the audit team conducted detailed discussions with the cognizant engineers on the implementation and control of the program. It reviewed administrative control documentation and selected design documentation used by the applicant during the scoping and screening process. The audit team further reviewed a sample of system scoping and screening results reports for the main feedwater, emergency feedwater, and emergency diesel generator (EDG) to ensure that the applicant appropriately implemented the methodology outlined in the administrative controls. The team found the results reports to be consistent with the CLB, as described in the supporting design documentation.

2.1.3.1 Scoping Methodology

The audit team reviewed implementation procedures and engineering reports that describe the scoping and screening methodology implemented by the applicant. These procedures include LRPG-03, "System and Structure Scoping Guidelines"; LRPG-04, "Mechanical System Screening and Aging Management Reviews"; LRPG-05, "Electrical Systems Scoping, Screening and Aging Management Reviews"; LRPG-06, "Structural Screening and Aging

Management Reviews"; A2-ME-2003-001-1, "Aging Management Review of Nonsafety-related Systems and Components Affecting Safety-related Systems"; ULD-0-TOP-01, "Environmental Qualification"; ULD-0-TOP-02, "Fire Protection Topical"; ULD-0-TOP-19, "Station Blackout"; ULD-2-SYS-34, "DSS DEFAS Reactor Trip System (ATWS)"; SAR Section 5.2.4.3.2, "Pressurized Thermal Shock"; ULD-0-TOP-22, "ANO Component Classification Topical"; LRPG-01, "Project Plan"; A2-ME-2003-001-1, "Aging Management Review of Nonsafety-Related"; and LI-110, "Commitment Management Program." The team found that the scoping and screening methodology instructions are consistent with Section 2.1 of the LRA and are of sufficient detail to provide the applicant's staff with concise guidance on the scoping and screening implementation process to be followed during the LRA activities. In addition to the implementing procedures, the audit team reviewed supplemental design information, including design-basis documents, system drawings, and selected licensing documentation, which the applicant relied upon during the scoping and screening phases of the review. The team found these design documentation sources to be useful for ensuring that the initial scope of SSCs identified by the applicant is consistent with the CLB of ANO-2.

The applicant compiled lists of systems and structures from sources, such as the component and maintenance databases; design-basis documents; the Updated Final Safety Analysis Report (UFSAR); site architectural, civil, and piping and instrumentation diagrams (P&IDs); Maintenance Rule documents; regulatory compliance reports; Environmental Qualification Program documents; fire hazard analysis reports; safety evaluation reports (SERs); and the probabilistic risk assessment summary report. The applicant used these sources to identify the intended safety functions of the systems and structures in accordance with the criteria of 10 CFR 54.4(a)(1–3). The applicant used the component database system, "Passport," which identifies safety-related, Q-list components. This information was transferred to the License Renewal Information System and used to identify those systems containing safety-related and regulated event supporting components to be considered within scope for license renewal. The applicant documented the scoping results in accordance with LRPG-03.

2.1.3.1.1 Application of the Scoping Criteria in 10 CFR 54.4(a)

10 CFR 54.4(a)(1). Pursuant to 10 CFR 54(a)(1), the applicant must consider as within the scope of license renewal all safety-related SSCs which are relied upon to remain functional during and following design-basis events to ensure (1) the integrity of the reactor coolant pressure boundary, (2) the ability to shut down the reactor and maintain it in a safe-shutdown condition, or (3) the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referenced in 10 CFR 50.34(a)(1), 10 CFR 50.67(b)(2), or 10 CFR 100.11.

As part of its review of the applicant's scoping methodology, the audit team evaluated a sample of the license renewal database 10 CFR 54(a)(1) scoping results, examined a sample of the analyses and documentation to support these reviews, and discussed the methodology and results with the applicant's personnel responsible for these evaluations. The team verified that the applicant identified and used pertinent engineering and licensing information in order to determine the SSCs required to be within scope, in accordance with the 10 CFR 54.4(a)(1) criteria. On the basis of this sample review and discussions with the applicant, the audit team determined that the applicant's methodology for identifying systems and structures meeting the scoping criteria of 10 CFR 54(a)(1) is adequate.

The audit team noted that 10 CFR 54.4(a)(1)(iii) requires that the applicant consider within the scope of license renewal those SSCs that ensure the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in 10 CFR 50.34(a)(1), 10 CFR 50.67(b)(2), or 10 CFR 100.11. In Section 2.1.1.1 of the LRA, the applicant stated that, because of plant-unique considerations or preferences, it designated some components that do not perform any of the functions meeting the requirements of 10 CFR 54.4(a)(1) as safety related, such that certain items classified as safety related in the facility database do not perform any of the safety-related intended functions of 10 CFR 54.4(a)(1). The staff requested a description of the process used during license renewal scoping activities to disposition components classified as safety related that do not perform a safety-related intended function. In particular, the staff requested (a) a description of any components or structures classified as safety related in the facility safety classification database that are not included within the scope of license renewal under the 10 CFR 54.4(a)(1) criteria and (b) the process used to reconcile the facility database safety classification information with scoping intended function determinations. The staff documented this as Request for Additional Information (RAI) 2-1.3.

The applicant responded in a letter to the NRC dated May 19, 2004:

a. For the majority of mechanical components, the safety classification in the ANO-2 component database was consistent with the determination that the components required aging management review for license renewal. The following individual mechanical components were listed in the component database as safety-related but did not support the safety functions identified under the 10 CFR 54.4(a)(1) criteria or meet the 10 CFR 54.4(a)(2) or (a)(3) criteria and, therefore, did not require aging management review.

   Safety-related instrument air solenoid valves do not require aging management review since the passive pressure boundary function is not required for the system intended functions to be met. The components supplied by the instrument air solenoid valves fail to the safe position on loss of air pressure, so pressure boundary integrity of the solenoid valves that supply instrument air is not required to accomplish system intended functions.

   The emergency diesel generator air compressors and their relief valves are classified as safety-related in the database, but the compressors are not required to operate during the starting of the diesel. There is adequate air stored in tanks to ensure the diesel starts without the compressors. The compressors and relief valves are not part of the tank pressure boundary. These components are conservatively classified in the database, but are not required to accomplish system intended functions.

   Flexible stainless steel piping to reactor coolant pump seal pressure transmitters are shown as safety-related in the database, but are connected to nonsafety-related piping and transmitters and do not have a

safety function. These components are conservatively classified in the database, but are not required to accomplish system intended functions.

The review identified a few components identified as safety-related in the database where safety classification changes are pending that will change the classification to nonsafety-related.

There were no structures identified as safety-related in the component database that were not included in the structural aging management reviews.

b. As described in LRA Section 2.1.1, the process used to determine the systems and structures in the scope of license renewal for ANO-2 followed the recommendations of Nuclear Energy Institute (NEI) 95-10. Functions for the structures and mechanical systems were identified based on reviews of applicable plant licensing and design documentation. The applicable sections of the safety analysis report, technical specifications, maintenance rule scoping documents, upper level documents, and ANO topical reports for the NRC regulations identified in 10 CFR 54.4(a)(3) were used to determine system and structure functions. During system aging management reviews, detailed component level evaluations were completed to identify components that are required to support system level functions.

After completion of the system aging management reviews, a database review was performed that identified safety-related components in the component database that had not been identified as subject to aging management review. These components or groups of components were evaluated to confirm that a suitable basis was used for their exclusion. See the response to part (a) for discussion of the basis for exclusion of components classified as safety-related.

The staff concluded that the applicant's response describes the process used during license renewal scoping activities to disposition components classified as safety related that do not perform a safety-related intended function and, therefore, adequately addresses the questions documented in RAI 2.1-3.

10 CFR 54.4(a)(2). Pursuant to 10 CFR 54(a)(2), the applicant must consider to be within the scope of license renewal all nonsafety-related SSCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54(a)(1)(i)-(iii).

The applicant documented the review of scoping activities in support of 10 CFR 54.4(a)(2) in an engineering report titled, "Aging Management Review of Nonsafety-Related Systems and Components Affecting Safety-Related Systems." The applicant discussed the scoping methodology as it relates to the nonsafety-related criteria in accordance with 10 CFR 54.4(a)(2). With respect to the nonsafety-related criteria, the applicant stated that it performed a review to identify the nonsafety-related SSCs whose failure could prevent satisfactory accomplishment of the safety-related intended functions identified in 10 CFR 54.4(a)(1).

As stated in the LRA, the applicant identified nonsafety-related SSCs whose failure could prevent satisfactory accomplishment of a safety function. It considered the impacts of nonsafety-related SSC failures as either functional or spatial. In a functional failure, the failure of an SSC to perform its normal function impacts another safety function. In a spatial failure, the loss of structural or mechanical integrity of an SSC in physical proximity to a safety-related component impacts a safety function.

The applicant used three steps to evaluate the potential for spatial interaction of fluid-filled, nonsafety-related piping with safety-related systems or components—(1) determination of whether the pipe contains liquid, (2) determination of whether the piping system has components in safety-related structures or a location containing a safety-related system, and (3) determination of whether the potential exists for spatially related interaction between the nonsafety-related, fluid-filled system and a safety-related system or component. After identifying fluid-filled systems through a component database review, the applicant used a spaces approach to identify nonsafety, fluid-filled systems which are located in the proximity of safety-related systems.

The applicant installed protective features (e.g., whip restraints, spray shields, supports, and barriers) to protect safety-related SSCs against spatial interaction with nonsafety-related SSCs. The applicant included such protective features credited in the plant design within the scope of license renewal and as subject to an AMR. Where those protective features provide adequate protection, the applicant excluded the nonsafety-related system itself from the scope of license renewal. Protective features are typically associated with a structure and are addressed in the structural AMR.

The audit team determined that the applicant classified SSCs required to perform a function in support of other safety-related components as safety-related and included them within the scope of license renewal. For the few exceptions where nonsafety-related equipment must remain functional in support of a safety function, the applicant included the supporting systems within the scope as nonsafety-related SSCs affecting safety-related SSCs. The applicable sections of the SAR, technical specifications, Maintenance Rule scoping documents, and design-basis documents provide the system information to determine the appropriate systems and structures in this category.

For nonsafety-related piping systems directly connected to safety-related SSCs, the nonsafety-related piping and supports, up to and including the first equivalent anchor beyond the safety/nonsafety-related interface, are subject to an AMR. In addition, nonsafety-related portions of safety-related systems downstream of the first anchor are subject to an AMR if they have the potential for spatial interaction with safety-related SSCs.

By letters dated December 3, 2001, and March 15, 2002, the NRC issued a staff position to the NEI which describes areas to be considered and options it expects licensees to use to determine what SSCs meet 10 CFR 54.4(a)(2) (i.e., all nonsafety-related SSCs whose failure could prevent satisfactory accomplishment of any safety-related functions identified in 10 CFR 54.4(a)(1)(i–iii)). The December 3 letter provides specific examples of operating experience which identify pipe failure events (summarized in Information Notice (IN) 2001-09, "Main Feedwater System Degradation in Safety-Related ASME Code Class 2 Piping Inside the Containment of a Pressurized Water Reactor") and the approaches the NRC considers acceptable to determine which piping systems should be included within scope based on

10 CFR 54.4(a)(2). The March 15 letter further describes the staff's expectations for the evaluation of nonpiping SSCs to determine which additional nonsafety-related SSCs are within the scope. The position states that applicants should not consider hypothetical failures, but rather should base their evaluations on the plant CLB, engineering judgment and analyses, and relevant operating experience. The paper further describes operating experience as all documented plant-specific and industry wide experience which can be used to determine the plausibility of a failure. Documentation would include NRC generic communications and event reports, plant-specific condition reports, industry reports (e.g., significant operating event reports), and engineering evaluations.

The audit team determined that Section 2.1.1.2.2, "Spatial Failures of Nonsafety-Related SSCs," of the LRA states that the nonsafety-related piping and supports, up to and including the first equivalent anchor beyond the safety/nonsafety interface, are within the scope of license renewal and subject to an AMR. The staff requested additional information regarding the process used by the applicant to ensure that it adequately considered all nonsafety-components and structures between the safety/nonsafety interface and the first equivalent anchor point during scoping. Specifically, staff asked the applicant to describe the method used to ensure that it considered all material-environment combinations between the safety/nonsafety interface and the first equivalent anchor during an AMR. The staff documented this as RAI 2.1-4, part (a).

The applicant responded to RAI 2.1-4, part (a), in a letter to the NRC dated May 19, 2004. For ANO-2, the nonsafety-related piping connected to safety-related piping up to the first equivalent anchor beyond the safety/nonsafety interface is within the scope of license renewal and subject to an AMR. The safety/nonsafety interface is normally shown on the LRA drawings through the use of license renewal boundary flags. In most cases, flags indicate seismic Class 1 evaluation boundaries on the LRA drawings. However, the exact location of the equivalent anchor may not be indicated on these drawings. To assure that the LRA AMR summary tables include all material and environment combinations, the applicant reviewed the systems within the scope of license renewal that contain safety-related components. The applicant reviewed piping classifications beyond the license renewal boundary indicated on the drawings for these systems to ensure that no new material-environment combinations exist. To do this, the applicant either (1) traced piping from the license renewal boundary back to an obvious anchor point (i.e., a larger line or a larger component such as a pump or heat exchanger), or (2) when a seismic Class 1 boundary flag was available, traced the piping back to at least two major components beyond the flag to identify piping class changes.

This approach assured that the piping reviewed would include the equivalent anchor. If the applicant identified a piping material or environment change, it compared the change with the AMR results for that system or a connected system to validate that the material-environment combination was addressed. The review of these systems confirmed that LRA Section 3.0 includes all applicable material-environment combinations, up to and including the first equivalent anchor.

The staff concluded that the applicant's response provides information regarding the process it used to ensure that it adequately considered all nonsafety-components and structures between the safety/nonsafety interface and the first equivalent anchor point during scoping and adequately addressed the questions documented in RAI 2.1-4, part (a).

The audit team determined that Section 2.1.1.2.2 of the LRA states that nonsafety-related systems and nonsafety-related portions of safety-related systems containing steam or liquid that are in the proximity of safety-related equipment are considered within the scope of license renewal, per 10 CFR 54.4(a)(2). However, this section of the LRA also states that long-term exposure to conditions resulting from a failed nonsafety-related SSC (such as leakage or spray) is not considered credible. The staff requested that the applicant clarify its position and methodology relative to the consideration of spray and wetting of safety-related SSCs from the failure of nonsafety-related equipment. The staff documented this as RAI 2.1-4, part (b). Specifically, the staff asked the applicant to address the following:

(1) Clarify how it reached the determination that long-term exposure to conditions resulting from a failed nonsafety-related SSC are not considered credible. Address if the applicant excluded nonsafety-related SSCs from the scope of license renewal based on this determination.

(2) Describe how it considered the effects of short-term wetting and spray on passive and active safety-related SSCs during 10 CFR 54.4(a)(2) scoping. During the methodology audit, the applicant indicated that the methodology for evaluating spatial interactions assumes that safety-related SSCs can withstand short-term duration spray and wetting without a loss of intended function. Therefore, the staff asked the applicant to clarify its consideration of the effects of short-term spray and wetting during scoping. Furthermore, if the applicant assumed that safety-related SSCs could withstand short-term spray or wetting without a loss of intended function, it should describe the basis for this assumption.

(3) Identify if it used the System Walkdown Program described in Section B.1.28, "System Walkdown," of the LRA as the sole aging management program (AMP) for any nonsafety-related structures or components that could potentially spatially interact with safety-related SSCs. If only the System Walkdown Program manages the effects of aging for any nonsafety-related SSC, describe the applicant's consideration of the effects of short-term spray and wetting during scoping and AMR evaluations.

The applicant responded to RAI 2.1-4, part (b), in a letter to the NRC dated May 19, 2004, as follows:

1. LRA Section 2.1.1.2.2, under the heading of Leakage, Spray, or Flooding, states that "Long-term exposure to conditions resulting from a failed nonsafety-related SSC (such as leakage or spray) is not considered credible." This conclusion was not applied during scoping evaluations. If a steam or liquid-filled nonsafety-related system (or nonsafety-related portion of a safety-related system) was in a safety-related building, then that system was considered in scope for 10 CFR 54.4(a)(2) regardless of potential exposure duration. No nonsafety-related SSCs were excluded from the scope of license renewal based on the consideration that long-term exposure to conditions resulting from a failed nonsafety-related SSC was not credible.

2. The potential for wetting or spray on passive and active safety-related components was considered in scoping evaluations. Nonsafety-related

systems containing steam or liquid that are near safety-related equipment are considered in scope for 10 CFR 54.4(a)(2) regardless of potential exposure duration. An assumption that safety-related SSCs could withstand short-term spray or wetting without loss of intended function was not applied during scoping or screening.

3. As indicated in Table 3.3.2-11 of the LRA, the System Walkdown Program is credited as the sole aging management program for some nonsafety-related components that could spatially interact with safety-related SSCs. As stated above, the duration of potential spray or wetting was not a consideration during scoping. The System Walkdown Program as described in Appendix B.1.28 of the LRA is considered adequate since it requires periodic walkdowns that will detect and correct failures caused by long-term exposure to spray or wetting. Short-term exposure is not a concern for passive components such as valve bodies and piping. Active safety-related component failures due to short-term exposure would be detected in the course of normal operation, or through monitoring required by the maintenance rule, and appropriate corrective actions would be taken. This is consistent with the Statements of Considerations for the license renewal rule which states, "On the basis of consideration of the effectiveness of existing programs which monitor the performance and condition of systems, structures, and components that perform active functions, the Commission concludes that structures and components associated only with active functions can be generically excluded from a license renewal aging management review. Functional degradation resulting from the effects of aging on active functions is more readily determinable, and existing programs and requirements are expected to directly detect the effects of aging."

The staff concluded that the applicant's response to RAI 2.1-4, part (b), sections 1 and 2, clarifies its position and methodology relative to the consideration of spray and wetting of safety-related SSCs from the failure of nonsafety-related equipment and adequately addresses the questions documented in RAI 2.1-4, part (b), sections 1 and 2. The staff's concern with respect to using the System Walkdown Program as the sole aging management program for some nonsafety-related components was resolved by RAI 3.3.3.4.11-1, which is addressed in Section 3.3 of this SER. Therefore, RAI 2.1-4, part (b), section 3 is resolved.

On the basis of the additional information supplied by the applicant, including the determination of the credible failures which could impact the ability of safety-related SSCs to perform their intended functions, evaluation of relevant operating experience, and incorporation of identified nonsafety-related SSCs into the applicant's AMPs, and the results of NRC inspection and audit activities, the staff concludes that the applicant has, with the exceptions noted above regarding the response to RAI 2.1-4, part (b), section 3, supplied sufficient information to demonstrate that the applicant has identified as within the scope of license renewal all SSCs that meet the 10 CFR 54.4(a)(2) scoping requirements.

10 CFR 54.4(a)(3). Pursuant to 10 CFR 54(a)(3), the applicant must consider all SSCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48), EQ (10 CFR 50.49), PTS

(10 CFR 50.61), ATWSs (10 CFR 50.62), and SBO (10 CFR 50.63) to be within the scope of the license renewal. ANO-2 procedure 02-R-02008-01, "License Renewal Project System and Structure Scoping Method and Results," details the approach used to identify the scoping of the SSCs relied upon for these regulated events. The applicant identified SSCs within the scope of 10 CFR 54(a)(3) by reviewing associated plant documents. The NRC audit team reviewed a sample of the specific documentation referenced in 02-R-02008-01, including the following:

- ANO-2 SAR Section 9.5, "Fire Protection Program"
- ANO Engineering Standard EES-13, "Evaluation of Safe Shutdown Capability"
- ANO-2 Calculation 85-E-0087-01, "Fire Hazard Analysis Report Safe Shutdown Capability Assessment"
- ULD-0-TOP-01, "Environmental Qualification Topical"
- technical specification evaluation A2-EP-2002-004, "TLAA and Exemption Evaluation"
- ULD-2-SYS-34, Revision 0, "Diverse Scram and Diverse Emergency Feedwater Actuation Systems"
- ULD-0-TOP-19, Revision 0, "Station Blackout"

As part of its review of the applicant's scoping methodology, the audit team evaluated a sample of the license renewal database 10 CFR 54(a)(3) scoping results, examined a sample of the analyses and documentation to support these reviews, and discussed the methodology and results with the applicant's personnel responsible for these evaluations. The team verified that the applicant had identified and used pertinent engineering and licensing information to determine the SSCs required to be within scope in accordance with the 10 CFR 54.4(a)(3) criteria. Based on this sampling review and discussions with the applicant, the audit team determined that the applicant's methodology for identifying systems and structures meeting the scoping criteria of 10 CFR 54(a)(3) is adequate.

Mechanical Scoping Methodology. The applicant described the methodology used for mechanical scoping in LRA Section 2.1.1 LRPG-03, and LRPG-04. For each mechanical system within scope of license renewal, the applicant evaluated the components to determine those subject to an AMR. The applicant reviewed design-basis documents to identify the specific components that support the intended function of the mechanical system and to establish evaluation boundaries.

The applicant determined the evaluation boundary to be that portion of the system that is necessary to ensure that the intended function of the system will be performed. The applicant based the evaluation boundary on a review of numerous documents, including the UFSAR, component database, accident analyses, design-basis documents, and P&IDs. The applicant marked the evaluation boundary on the system P&ID.

The team determined that the applicant's proceduralized methodology is consistent with the description provided in Section 2.1.1 of the LRA and the guidance contained in Section 2.1 of NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear

Power Plants," (SRP-LR). Based on review of information contained in the LRA, the applicant's detailed scoping implementation procedures, and a sampling review of mechanical scoping results, the team concluded that the applicant's methodology for identification of structural components within the scope of license renewal meets the requirements of 10 CFR 54.4(a).

Structure Scoping Methodology. The applicant described the methodology used for structural scoping in LRA Section 2.1.1, LRPG-03, and in Section 2.4 of the system scoping method and results (SAR) procedure 02-R-2008-01, Revision 1. The applicant developed a list of plant structures from a review of civil/structural and plant layout drawings as the starting point for scoping and included all structures that could potentially support license renewal. It identified functions for the structures and structural components and commodities (e.g., pipe supports, structural steel, foundations, floors, walls, ceilings, penetrations, stairways, and curbs) based on reviews of plant licensing and design documentation, including the SARs. The applicant relied upon the SARs to identify safety classification of structures and structural components. The applicant considered Class I structures and structural components safety related.

The applicant determined structure evaluation boundaries, including examination of structure interfaces. It evaluated all structure functions against the criteria of 10 CFR 54.4(a)(1–3) and documented the results of this evaluation in the LRA. In those instances where the structure intended functions require support from other structures or systems, the applicant identified the supporting systems or structures and evaluated them against the criteria in 10 CFR 54.4(a)(2). The applicant used a single boundary diagram based on site plot and equipment layout drawings, which displays all of the structures in relation to one another. For in-scope structures, the applicant identified all structural components that are required to support the intended functions of the structure as within the scope of the Rule.

The audit team reviewed plant drawings and the list of in-scope plant structures that the applicant developed from a review of civil/structural and plant layout drawings and also interviewed engineering personnel to further assess the methodology used for scoping. The audit team compared the applicant's generic structural component listing to the typical structural commodity groups identified in Table 2.1-5 of the SRP-LR and concluded that the applicant's general structural component list is reasonable. Following identification of all system components, the applicant evaluated each component against the scoping criteria of 10 CFR 54.4(a). The applicant classified structural components meeting the criteria of 10 CFR 54.4(a) are within the scope of license renewal.

The audit team determined that the applicant's proceduralized methodology is consistent with the description provided in Section 2.1.1 of the LRA and the guidance contained in Section 2.1 of the SRP-LR. Based on review of information contained in the LRA, the applicant's detailed scoping implementation procedures, and a sampling review of structural component and commodity scoping results, the team concluded that the applicant's methodology for identification of structural components within the scope of license renewal meets the requirements of 10 CFR 54.4(a).

Electrical and Instrumentation and Control Scoping Methodology. The applicant described the methodology used for electrical and I&C scoping in LRA Section 2.1.1, LRPG-03, and LRPG-05. The applicant used a plant systems list from the ANO-2 component database which identifies the component safety, safety-related, or Q-classification using the same definition as that stated in 10 CFR 54.4. Specifically, the ANO-2 definition of safety related, which was used

to develop and maintain the component-level Q-list, includes the SSCs that are relied on to remain functional during or following design-basis events. The applicant also used NEI 95-10 to determine the electrical and I&C components to be included within the scope of the license renewal process for ANO-2. If any of the electrical components met the criteria of 10 CFR 54.4, the applicant considered them to be within the scope of license renewal and documented the results in Engineering Report 02-R-2008-01, the Scoping Methods and Results Report. The report also describes the method used to identify those electrical systems and structures which will meet the 10 CFR 54.4 criteria. In addition to the plant electrical systems, the applicant conservatively included certain nonplant equipment components of the switchyard within the scope of license renewal because of SBO considerations.

2.1.3.2 Screening Methodology

2.1.3.2.1 Mechanical Component Screening

The applicant described the methodology used for mechanical component screening in LRA Section 2.1.2.1 and LRPG-04.

The applicant determined that components subject to an AMR are those that perform an intended function without moving parts or a change in configuration or properties (i.e., passive) and are not subject to replacement based on qualified life or specified time period (i.e., long-lived). In accordance with LRPG-04, the applicant then determined whether the components within the evaluation boundary are passive and long-lived and documented the results.

The NRC audit team reviewed the methodology for identifying mechanical components subject to an AMR, as well as the applicant's technical justification for this methodology. The team also examined the applicant's results from the mechanical screening methodology by reviewing the components identified as within the scope of license renewal, the corresponding component intended functions, and the resulting list of components subject to an AMR.

The audit team noted that 10 CFR 54.21(a)(1) requires that SCs subject to an AMR encompass those SCs that (1) perform an intended function without moving parts or a change configuration or properties and (2) that are not subject to replacement based on a qualified life or specified time period. Table 2.1-3, "Specific Staff Guidance on Screening," of the SRP-LR provides guidance for determining if consumable items should be subject to an AMR. For consumables that are periodically replaced, Table 2.1-3 states that the applicant should identify the standards that are relied on for replacement as part of the methodology description. For consumables such as packing, gaskets, component seals, and O-rings, Table 2.1-3 states that these components may be excluded from an AMR using a clear basis. Section 2.1.2 of the LRA states that the process for evaluating consumables is consistent with the NRC staff guidance on consumables provided in a letter from C.I. Grimes, NRC, to D.J. Walters, NEI, dated March 10, 2000. The staff requested that the applicant provide a more detailed description of the actual method used to demonstrate that it adequately evaluated the criteria and the basis for that determination. The staff documented this RAI 2-1.5.

The applicant responded to RAI 2-1.5 in a letter to the NRC dated May 19, 2004. For ANO-2, the applicant reviewed consumable subcomponents based on criteria in the letter from C.I. Grimes, NRC, to D.J. Walters, NEI, dated March 10, 2000, which is consistent with the SRP-

LR, Table 2.1-3, issued April 2001. The applicant provided the following additional detail on the implementation for ANO-2:

- The applicant excluded packing, gaskets, components seals, and O-rings because these components are not relied on for the pressure boundary function, as stated in CE NPSD-1215 and ASME Code, Section III.

- The applicant evaluated structural sealants (elastomers) and identified aging effects and AMPs as applicable.

- Oil, grease, and component filters are tested or inspected periodically and replaced under ANO-2 maintenance activities. They are excluded because they are considered short-lived.

- System filters are inspected periodically and replaced as required under ANO-2 maintenance activities. Fire extinguishers and hoses are inspected per ANO-2 SAR Section 9.5.1 and Appendix 9D. Air packs are maintained under the Self-Contained Breathing Apparatus Program based on 42 CFR 84, 29 CFR 19.10, 29 CFR 19.26, NUREG-0041, and ANSI-Z88.2. These items are excluded because they are short-lived (i.e., periodically inspected and replaced based on their condition).

The staff concluded that the applicant's response provides a more detailed description of the actual method used to demonstrate that it adequately evaluated the criteria and the basis for that determination. Therefore, the applicant adequately addressed the questions documented in RAI 2.1-5.

The team determined that the applicant's mechanical component screening methodology described in LRA Section 2.1.2.1 is consistent with the guidance contained in the SRP-LR. It is capable of identifying those passive, long-lived components within the scope of license renewal that are subject to an AMR. Therefore, the screening methodology for structural components and commodities is adequate.

2.1.3.2.2 Structural Component Screening

The applicant described the methodology used for structural scoping in LRA Section 2.1.2.2 and LRPG-06. For each structure within the scope of license renewal, the applicant evaluated the structural components and commodities to determine those subject to an AMR. The screening process involved a review of design-basis documents to identify specific structural components and commodities that constitute the structure. The applicant determined that structural components or commodities subject to an AMR are those that perform an intended function without moving parts or a change in configuration or properties (i.e., passive) and are not subject to replacement based on qualified life or specified time period (i.e., long-lived). Consequently, the applicant determined that since structures are inherently passive, and with few exceptions long-lived, it based the screening of structural components and commodities primarily on whether they perform an intended function.

The applicant evaluated structural elements and components in commodity groups based on materials such as steel, threaded fasteners, and concrete. The scoping and screening evaluation did not identify and evaluate these multiple structural components on an individual

basis. Rather, the evaluation grouped similar structural components as generic components for scoping and screening. The applicant generally categorized structural components and commodities that are attached to a structure or reside within a structure as either component supports or as other structural members.

The applicant established evaluation boundaries for mechanical component supports in accordance with ASME Code, Section XI, Subsection IWF, which governs inspection of component supports. For support of electrical components, the evaluation boundary includes mechanical or integral attachments to the building structure. The evaluation boundary for other structural members includes the structural component and the associated attachment to the building structure. The applicant used the guidelines provided in NEI 95-10 to determine the intended functions of SSCs and commodities for the LRA.

The team reviewed the methodology for identifying structures and structural components and commodities subject to an AMR, as well as the applicant's technical justification for this methodology. The team also examined the applicant's results from the structural screening methodology by reviewing the structural components and commodities identified as within the scope of license renewal, the corresponding structural component intended functions, and the resulting list of structural components subject to an AMR.

Revision 1 to LRPG-06 provides guidance on conducting structural component and commodity screening. The team reviewed structural component and commodity groups developed under the screening methodology, which also established evaluation boundaries and intended functions. The team also reviewed LRA Table 3.5.1, which summarized the AMPs for SC supports evaluated in NUREG-1801, "Generic Aging Lessons Learned (GALL) Report."

The team determined that the applicant's structural component screening methodology described in LRA Section 2.1.2.2 is consistent with the guidance contained in the SRP-LR. It is capable of identifying those passive, long-lived components within the scope of license renewal that are subject to an AMR. Therefore, the screening methodology for structural components and commodities is adequate.

2.1.3.2.3 Electrical and Instrumentation and Control Component Screening

The applicant described the methodology used for mechanical component screening in LRA Section 2.1.2.3 and LRPG-04. The applicant separated the active components from the passive ones using the guidance in NEI 95-10. The screening criteria initially identified passive electrical systems and components (i.e., those which perform their intended function without moving parts and without a change in configuration or properties the component are considered passive). Within the passive components, if the component is not subject to replacement based on a qualified life or specified time period, it is considered long-lived and subject to an AMR. As a result, the applicant identified the electrical and I&C system commodities that are within the scope and subject to AMR in a table in the LRA.

Supports for electrical components include cable trays and conduit supports, electrical panels, racks, cabinets, and other enclosures. The evaluation boundary for these items includes supporting elements, such as mechanical or integral attachments to the building structure.

The team reviewed the methodology for identifying electrical components subject to an AMR, as well as the applicant's technical justification for this methodology. The team also examined the applicant's results of the application of the screening methodology by reviewing components identified as within the scope of license renewal. Procedure LRPG-05 provides guidance for conducting the electrical screening. The team reviewed the electrical commodity groups developed under the screening methodology.

The team determined that the applicant's electrical scoping and screening methodology described in LRA Section 2.1.2.3 is consistent with the guidance contained in the SRP-LR. It is capable of identifying those passive, long-lived components within the scope of license renewal that are subject to an AMR. Therefore, the screening methodology for electrical components is adequate.

The NRC staff's scoping and screening methodology audit identified a number of items requiring action by the applicant. These are identified in the ANO-2 Audit Trip Report. Most of the items were resolved thorough request for additional information as noted above. RAI 2.1-4, part b, section 3 was subsequently resolved and discussed in the resolution of RAI 3.3.3.4.11-1 in Section 3.3 of this SER.

2.1.4 Conclusion

The staff formed the basis of its safety determination based on its review of the information presented in LRA Section 2.1, the supporting information in LRPG-03, LRPG-04, LRPG-05, LRPG-06, A2-ME-2003-001-1, ULD-0-TOP-01, ULD-0-TOP-02, ULD-0-TOP-19, ULD-2-SYS-34, SAR Section 5.2.4.3.2, ULD-0-TOP-22, LRPG-01, ULD-0-TOP-22, A2-ME-2003-001-1, and LI-110, the information presented during the scoping and screening audit, the NRC scoping and AMR inspections, and the applicant's responses to the staff's RAIs. The staff found that the applicant's scoping and screening methodology, including its supplemental 10 CFR 54.4(a)(2) review which brought additional nonsafety-related piping segments and associated components into the scope of license renewal, is consistent with the requirements of the Rule and the staff's position on the treatment of nonsafety-related SSCs. On the basis of this review, the staff concludes that the applicant's methodology for identifying the SSCs within the scope of license renewal and the SCs requiring an AMR is consistent with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1).

2.2 Plant-Level Scoping Results

In LRA Section 2.2, the applicant provided the results of plant-level scoping review. The staff reviewed this section of the LRA to determine whether the applicant has properly identified all plant-level systems and structures that are within the scope of license renewal, as required by 10 CFR 54.4.

2.2.1 Summary of Technical Information in the Application

In LRA Tables 2.2-1a, 2.2-1b, 2.2-2, 2.2-3, and 2.2-4, the applicant listed plant systems and structures that are within the scope of license renewal and those that are not within the scope of license renewal. Based on the design-basis events considered in the plant's CLB, other CLB information relating to nonsafety-related systems and structures, and certain regulated events, the applicant identified those plant-level systems and structures within the scope of license renewal, as defined in 10 CFR 54.4.

2.2.2 Staff Evaluation

In LRA Section 2.1, the applicant described its methodology for identifying the SCs that are within the scope of license renewal and subject to an AMR. The staff reviewed the scoping and screening methodology and provides its evaluation in Section 2.1 of this SER. To determine that the applicant has properly implemented its methodology, the staff focused its review on the implementation results shown in LRA Tables 2.2-2 and 2.2-4 to confirm that the applicant did not omit plant-level systems and structures within the scope of license renewal.

The staff considered whether the applicant properly identified the structures and systems within the scope of license renewal, in accordance with 10 CFR 54.4. The staff reviewed selected structures and systems identified by the applicant as not falling within the scope of license renewal to determine that they have no intended functions that do in fact fall within the scope of license renewal. The staff conducted its review of the applicant's implementation in accordance with Section 2.2 of the SRP-LR.

The staff reviewed LRA Section 2.2 and sampled the contents of the UFSAR, based on the listing of systems and structures in LRA Tables 2.2-2 and 2.2-4, to determine whether the applicant omitted any systems or structures that may have intended functions, as identified by 10 CFR 54.4, from the scope of license renewal.

During its review of LRA Section 2.2 and LRA Tables 2.2-2 and 2.2-4, the staff determined that it needed additional information and/or clarification. The following describes the staff's RAI, provided to the applicant by letter dated May 11, 2004, and the applicant's response.

RAI 2.2-1

The UFSAR does not describe some of the mechanical systems that the applicant determined not to be within the scope of license renewal, as listed in LRA Table 2.2-2. The staff could not determine whether these systems have the intended functions that would meet any of the criteria in 10 CFR 54.4(a)(1–3). For those systems that are not described in the UFSAR, the staff requested that the applicant briefly describe the system, including its intended function.

Applicant's Response and Staff's Evaluation

In its response dated June 10, 2004, the applicant stated that Table 2.2-2 identifies six mechanical systems that do not have a UFSAR reference. These systems include the administration building heating and ventilation, diesel fuel services, emergency operations facility, low-level radwaste, miscellaneous system, and startup boiler.

The administration building heating and ventilation system is a nonsafety-related heating and air conditioning system that provides ventilation to the administration building. The building houses offices for site personnel.

The diesel fuel services system includes only two mechanical components, which are nonsafety-related drain valves for the enclosures around the EDG fuel oil day tanks.

The mechanical components in the emergency operations facility (EOF) include a backup diesel generator and heating, ventilation, and air conditioning (HVAC) components such as heat exchangers, blowers, and filters. The EOF serves as an alternate location for the technical support center and the operational support center, if required by the site emergency plan. The building is located 1.05 km (0.65 mi) from the reactor buildings and serves as a training center during normal plant operations.

The mechanical components in the low-level radwaste system include tanks, filters, valves, compressors, and piping that support various activities in handling low-level radioactive waste in the low-level radwaste building, which is located outside the plant power block away from safety-related structures. The low-level radwaste storage building temporarily stores low-level radioactive waste before its shipment off site. This system is only required to support the collection and handling of low-level solid radioactive waste.

The miscellaneous system includes miscellaneous site equipment that is entered into the site component database for work tracking and other purposes but is not a part of an existing system. The mechanical components include a portable hoist and backup power diesel generators for site office buildings.

The startup boiler provides auxiliary steam for plant heating and testing as required during periods when the plant is shut down. The system consists of the boiler, pumps, filters, valves, piping, and other miscellaneous mechanical components.

Based on its review, the staff finds the applicant's response to RAI 2.2-1 acceptable, because none of the systems described has an intended function that meets any of the criteria in 10 CFR 54.4(a)(1–3). The staff confirmed that these systems are not within the scope of license renewal. Therefore, the staff considers its concern described in RAI 2.2-1 resolved.

The staff has completed its review of plant-level scoping results. The staff did not identify any omissions of structures and systems that meet the scoping criteria of 10 CFR 54.4.

2.2.3 Conclusion

The staff reviewed LRA Section 2.2, supporting information in the ANO-2 UFSAR, and the information provided in the applicant's response to the staff's RAIs to determine whether the applicant omitted any structures and systems that should be within the scope of license renewal. On the basis of its review, the staff concludes that the applicant has appropriately identified the structures and systems that are within the scope of license renewal in accordance with 10 CFR 54.4. Sections 2.3 through 2.5 of this SER provide the staff's detailed review of the SSCs that are subject to an AMR.

2.3 System Scoping and Screening Results—Mechanical Systems

The sections of this SER noted in parentheses address the following mechanical system scoping and screening results for license renewal:

- reactor coolant system (2.3.1)
  - reactor vessel and control element drive mechanism pressure boundary
  - reactor vessel internals
  - Class 1 piping, valves, and reactor coolant pumps
  - pressurizer
  - steam generators
- engineered safety features (2.3.2)
  - emergency core cooling
  - containment spray system
  - containment cooling
  - containment penetrations
  - hydrogen control
- auxiliary systems (2.3.3)
  - spent fuel pool
  - water suppression fire protection
  - emergency diesel generator
  - alternate ac diesel generator
  - chemical and volume control
  - Halon fire protection and reactor coolant pump motor oil leakage collection
  - fuel oil
  - service water
  - auxiliary building ventilation
  - control room ventilation
  - miscellaneous systems within scope for 10 CFR 54.4(a)(2)
  - other miscellaneous systems
- steam and power conversion systems (2.3.4)
  - main steam
  - main feedwater
  - emergency feedwater

Pursuant to 10 CFR 54.21(a)(1), applicants must identify and list SCs that are subject to an AMR. These are passive, long-lived SCs that are within the scope of license renewal. To determine whether the applicant has properly implemented its methodology, the staff focused its review on the implementation results. This approach allows the staff to confirm that the applicant has not omitted any system components that are subject to an AMR.

Staff Evaluation Methodology

The staff's evaluation of the information provided in the LRA was performed in the same manner for all mechanical systems. The objective of the review was to determine if the components and supporting structures for a specific mechanical system that appeared to meet the scoping criteria specified in the rule were identified by the applicant as within the scope of license renewal in accordance with 10 CFR 54.4. Similarly, the staff evaluated the applicant's screening results to verify that all long-lived, passive components were subject to an AMR in accordance with 10 CFR 54.21(a)(1).

Scoping. To perform its evaluation, the staff reviewed the applicable LRA section and associated component drawings, focusing its review on components that had not been identified as within the scope of renewal. The staff reviewed relevant licensing basis documents, including the UFSAR, for each mechanical system to determine if the applicant had omitted system components with intended functions delineated under 10 CFR 54.4(a) from the scope of license renewal. The staff also reviewed the licensing basis documents to determine if all intended function(s) delineated under 10 CFR 54.4(a) were specified in the LRA. If omissions were identified, the staff requested additional information to resolve the discrepancy.

Screening. Once the staff's review of the scoping results was completed, the staff evaluated the applicant's screening results. For those structures and components with intended functions, the staff sought to determine if the function(s) are performed with moving parts or a change in configuration or properties, or if they are subject to replacement based on a qualified life or specified time period, as described in 10 CFR 54.21(a)(1). For those that did not meet either of these criteria, the staff sought to confirm that these mechanical system components were subject to an AMR as required by 10 CFR 54.21(a)(1). If discrepancies were identified, the staff requested additional information to resolve them.

In the LRA, the applicant described a methodology for mechanical system scoping and screening that interprets 10 CFR 54.21(a) differently from previous LRAs and the SRP-LR. Specifically, the applicant did not define the component-level scoping boundary. For an in-scope system, the applicant included all components within the scope of license renewal regardless of their intended functions. The license renewal drawings submitted by the applicant depict a boundary for the components of a system that are subject to an AMR. They do not depict components within the scope of license renewal. On the license renewal drawings, the applicant highlighted those components that are passive and long-lived and have intended functions as subject to an AMR. Therefore, the LRA Section 2.3 tables do not identify and list some components that have intended functions, nor do the license renewal drawings highlight them, because the component scoping boundary is not defined. The applicant combined passive, long-lived, and intended function criteria into one screening process to meet the requirements of 10 CFR 54.21(a)(1).

The methodology used by previous LRA applicants, consistent with the SRP-LR review guidance, describes two steps to perform scoping and screening. The first step, scoping, identifies those SSCs within the scope of license renewal in accordance with 10 CFR 54.4(a). The applicant then identified the components of the in-scope system that have intended functions to be included in the license renewal scope, in accordance with the criteria of 10 CFR 54.4(a). The component scoping boundary within a system is then highlighted on license renewal drawings. The second step, screening, identifies those components in the

scoping boundary that are passive and long-lived in accordance with 10 CFR 54.21(a)(1). The resulting components from these scoping and screening steps are subject to an AMR.

As a result of using a different scoping and screening process, and with insufficient information provided in the LRA associated with this methodology, the NRC staff could not determine whether the applicant omitted any components within the scope of license renewal and subject to an AMR. The applicant did not provide scoping information at the component-level equivalent to that provided by previous LRA applicants for the review of systems in LRA Section 2.3.

To better understand the applicant's scoping methodology, the staff visited the ANO-2 plant site between January 20–22, 2004, to review site documentation including, the applicant's license renewal project guidelines and procedures. The results of the audit were documented in a trip report for the site visit issued on May 17, 2004 (ML040610626). The purpose of this plant audit was to determine, by review of plant information, that system components within the scope of license renewal were identified and that the components of the in-scope systems subject to an AMR were properly screened. The staff reviewed the applicant's site documentation in the following areas:

- license renewal process plan
- license renewal project guidelines—system and structure scoping
- license renewal project guidelines—system screening and AMRs
- engineering report for system and structure scoping method and results
- engineering report for screening results for AMRs
- engineering reports, AMR results for selected systems
- Engineering Report A2-ME-2003-001-1

To ensure that the applicant screened all components of an in-scope system or identified them as passive and long-lived, in accordance with 10 CFR 54.21(a)(1), the staff audited engineering reports on the main feedwater system, the emergency feedwater system, and the EDG system. Additionally, the LRA did not provide sufficient scoping information for the miscellaneous systems within scope that meet the 10 CFR 54.4(a)(2) criteria. Therefore, the staff reviewed Engineering Report A2-ME-2003-001-1 to confirm mechanical component scoping and screening results. As a result of its review of this report, the staff issued RAI 2.3.3.11-3, described in Section 2.3.3.11 of this SER. The staff also reviewed engineering reports for other individual systems to confirm the applicant's responses to the staff's draft RAIs. A trip report issued on May 17, 2004 documents the results of the plant audit. In its trip report, the staff noted which engineering reports it reviewed at the plant site and the additional information that it requested based on the review of the site documentation.

As a result of the staff's review of LRA Section 2.3 and the plant audit, the staff found that it needed additional clarification to determine whether the applicant's component-level scoping for the systems within scope is adequate. Therefore, by letter dated May 11, 2004, the staff issued RAI 2.3-1, discussed below, to the applicant to determine whether it properly applied the scoping criteria of 10 CFR 54.4(a).

RAI 2.3-1

Section 2.1.1 of the LRA states that the applicant prepared license renewal drawings to indicate components subject to an AMR. However, the license renewal drawing legends indicate that the highlighted portions of the systems with flags represent the systems and components that are within the scope of license renewal. The staff noted that this appears to be an inconsistency between the drawing legend and the LRA statement. The staff requested that the applicant clarify this discrepancy.

Additionally, 10 CFR 54.21(a)(2) requires applicants to describe and justify the methods used in complying with 10 CFR 54.21(a)(1). In LRA Section 2.1.2, the applicant briefly described the screening methodology, stating, "for each mechanical system within the scope of license renewal, the screening process identified those components that are subject to an aging management review." This description of the screening methodology, specifically for mechanical systems, is not clear to the staff. It does not adequately describe the method used to determine how the applicant screened a component from further evaluation. The staff requested that the applicant clarify the methodology used to perform the screening of mechanical components and discuss how it established the system evaluation boundaries and determined the component intended functions.

Applicant's Response and Staff's Evaluation

In its response to the first part of RAI 2.3-1, dated June 10, 2004, the applicant stated that the LRA Section 2.1.1 statement is correct, and that the drawings are intended to be an aid used in conjunction with the tables in LRA Section 2.3 to identify and list those SCs subject to an AMR, as required by 10 CFR 54.21(a)(1).

In its response to the second part of RAI 2.3-1, dated June 10, 2004, the applicant stated that if a system is within scope, then all of the components in that system are conservatively considered to be within the scope of license renewal for the purpose of identifying SCs that are subject to an AMR.

The applicant further defined the screening process in accordance with 10 CFR 54.21(a)(1) for SCs subject to an AMR that perform an intended function without moving parts or a change in configuration or properties (i.e., passive) and that are not subject to replacement based on a qualified life or specified time period (i.e., long-lived). The applicant stated that its screening process identifies functions for the systems based on reviews of applicable plant licensing and design documentation. The applicant used sections of the UFSAR, technical specifications, Maintenance Rule scoping documents, design-basis documents, and ANO topical reports for the NRC regulations identified in 10 CFR 54.4(a)(1–3) to determine system functions and identify the components that perform intended functions required to accomplish those system functions. The applicant stated that the license renewal boundary on the drawings may be defined as the evaluation boundary between the portion of the system that performs an intended function (requires an AMR) and the portion of the system that does not perform an intended function (does not require an AMR).

Based on its review of the applicant's response and discussions with the applicant in a subsequent teleconference, the staff requested further information on the process of screening of mechanical components and the identification of the evaluation boundary.

In its clarification letter dated July 22, 2004, the applicant stated that the identification of components subject to an AMR began with determining the system evaluation boundary. The evaluation boundary includes those portions of the system necessary to ensure that the intended functions of the system will be performed. The applicant included components needed to support system-level intended functions identified in the scoping process within the evaluation boundary. System components that do not support an intended function are outside the evaluation boundary and were not considered further.

The applicant also stated that, within the evaluation boundary, screening was performed to determine components that are subject to an AMR. Each component subject to an AMR was assigned a component intended function, such as pressure boundary or heat transfer, that supports the system intended function. It grouped individual components where possible to allow disposition of the entire group with a single AMR. The applicant grouped components based on common materials of construction and common environments, then identified the aging effects requiring management for each component group. These component groups are the component types identified in the LRA Section 3.x.2-y tables, where 3 indicates the application section number; x indicates the table number from Volume 1 of the GALL Report; 2 indicates that this is the second table in the section; and y indicates the system table number.

Based on its review of the applicant's clarification discussed above, the staff finds the applicant's response to RAI 2.3-1 acceptable because it adequately describes the scoping and screening methodology for mechanical components and the definition of the evaluation boundary, and because it provides confirmation that the applicant did not omit any mechanical components from the scope of license renewal. Therefore, the staff considers its concern described in RAI 2.3-1 resolved.

On the basis of its review of the results of the plant audit, the LRA, and the applicant's responses to RAIs, the staff finds that the applicant's methodology for scoping and screening is well documented in an auditable and retrievable form at the plant site. The staff finds that the results of the audit on the three selected systems confirm that the applicant did not omit any components subject to an AMR for these systems. In the LRA Section 2.3 tables, the staff finds that the results are consistent with the methodology and are acceptable. With the additional information obtained from the site, the staff concludes that the applicant, while using a different methodology from that described in the review guidance of the SRP-LR, provided scoping and screening results and components subject to an AMR with no omissions.

For other in-scope systems that the staff did not audit at the plant site, The staff issued RAIs related to components that could be subject to an AMR based on its review of the LRA, UFSAR, and site documentation. The following describes the staff's detailed review of the balance of plant systems in LRA Section 2.3.

2.3.1 Reactor Coolant System

In Section 2.3.1 of the LRA, the applicant identified the SCs of the RCS that are subject to an AMR for license renewal. The applicant described the RCS in the following sections of the LRA:

- reactor vessel and control element drive mechanism pressure boundary (2.3.1.1)

- reactor vessel internals (2.3.1.2)
- Class 1 piping, valves, and reactor coolant pumps (2.3.1.3)
- pressurizer (2.3.1.4)
- steam generators (2.3.1.5)

The applicant identified the following criteria for the RCS to determine the SSCs that are within the scope of license renewal:

• safety-related	10 CFR 54.4(a)(1)
• nonsafety-related that can prevent a safety-related function	10 CFR 54.4(a)(2)
• pressurized thermal shock	10 CFR 54.4(a)(3)
• station blackout	10 CFR 54.4(a)(3)
• anticipated transient without scram	10 CFR 54.4(a)(3)
• environmental qualification	10 CFR 54.4(a)(3)
• fire protection	10 CFR 54.4(a)(3)

2.3.1.1 Reactor Vessel and Control Element Drive Mechanism Pressure Boundary

2.3.1.1.1 Summary of Technical Information in the Application

In Section 2.3.1.1 of the LRA, the applicant described the reactor vessel and control element drive mechanism (CEDM) pressure boundary. The ANO-2 reactor vessel and CEDM pressure boundary items subject to an AMR include the closure head; closure head flange; closure stud assemblies; vessel flange; upper, intermediate, and lower shells; core stabilizing and stop lugs; core barrel support ledge; vessel supports; bottom head; primary coolant nozzles and safe ends; pressure boundary subcomponents of the CEDMs; CEDM nozzles; instrumentation nozzles; surveillance capsule holders; flow skirt; and vent line. The vessel contains the nuclear fuel core, core support structures, control rods, and other parts directly associated with the core.

Two hollow metallic O-rings seal the reactor vessel closure. Two leak-off connections, one between the inner and outer ring and one outside the outer O-ring, detect seal leakage. The O-rings do not support an intended function of the reactor vessel and are therefore not subject to an AMR.

In Table 2.3.1-1 of the LRA, the applicant identified the reactor vessel and CEDM pressure boundary component types that are within the scope of license renewal and subject to an AMR, including closure head lifting lugs, closure studs, closure nuts and washers, core stabilizing lugs, core stop lugs, flow skirt, grayloc clamp, grayloc clamp studs, grayloc clamp nuts, in-core instrumentation (ICI) drive nuts, ICI spacer sleeves, reactor vessel support pads, shear lugs, surveillance capsule holders, CEDM motor housing, CEDM upper pressure housing, CEDM ball seal housing, CEDM upper pressure housing upper fitting, CEDM motor housing upper and lower end fittings, CEDM upper pressure housing lower fitting, CEDM nozzle, ICI nozzle tubes, CEDM steel ball, ICI flange adapter/seal plate, reactor vessel vent pipe, reactor vessel vent pipe flange, bottom head (torus and dome), upper shell, closure head dome (torus and dome), closure head flange, intermediate shell, lower shell, primary inlet nozzles, primary outlet nozzles, primary inlet nozzle safe ends, primary outlet nozzle safe ends, and vessel flange.

2.3.1.1.2 Staff Evaluation

The staff reviewed LRA Section 2.3.1.1, Table 2.3.1-1, and SAR Sections 4.2.3 and 5.4.6 to determine whether the applicant identified the reactor vessel and CEDM pressure boundary as within the scope of license renewal and subject to AMR, in accordance with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a). The staff used the evaluation methodology described in Section 2.3 of this SER. The staff conducted its review in accordance with the guidance described in Section 2.3, "Scoping and Screening Results—Mechanical Systems," of the SRP-LR.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR, in accordance with the requirements of 10 CFR 54.4(a), to determine that the applicant did not inadvertently omit from the scope of license renewal any reactor vessel components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed the reactor vessel components that the applicant identified as within the scope of license renewal to determine that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.1.1, the staff identified an area in which it needed additional information to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated April 23, 2004, the staff issued an RAI concerning the exclusion of the reactor vessel O-rings leak monitor tube to determine whether the applicant properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1).

The staff asked the applicant to confirm whether the O-ring leak monitor tube serves as a pressure boundary and whether the piping should be within the scope of license renewal. In its response, dated May 24, 2004, the applicant stated that the reactor vessel flange leak detection piping contains an integral orifice with the flange itself which limits flow (in the event of O-ring failure) to within the makeup capability of the plant. In the event of leakage past the O-rings and through the restricting orifice, the downstream vessel leak detection piping and associated valves do not perform an RCS pressure boundary function and would only serve to direct RCS fluid to the drain tank. The staff finds the response acceptable.

On the basis of its review, the staff found that the applicant has identified those portions of the RCS that meet the scoping requirements of 10 CFR 54.4(a) and has included those portions of the system within the scope of license renewal in LRA Section 2.3.1.1. The applicant has also included RCS components that are subject to an AMR in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.1.1.3 Conclusion

During its review of the information provided in the LRA, license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the reactor vessel and RCS CEDM pressure boundary. Therefore, the staff concludes that the applicant has adequately identified the RCS SCs that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the reactor vessel system SCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.1.2 Reactor Vessel Internals

2.3.1.2.1 Summary of Technical Information in the Application

In Section 2.3.1.2 of the LRA, the applicant described the reactor vessel internals. The reactor vessel internals are designed to support and orient the reactor core and control element assemblies, direct the reactor coolant flow from the core, and guide the ICI. The reactor vessel internals subject to an AMR include the upper internals assembly, control element assembly (CEA) shroud assemblies, core support barrel (CSB) assembly, core shroud assembly, lower internals assembly, and ICI.

In Table 2.3.1-2 of the LRA, the applicant listed the reactor vessel internals component types that are within the scope of license renewal and subject to an AMR, including CEA instrument tube, CEA shroud adapter, CEA shroud support, positioning plate, CEA shroud extension shaft guides, shaft cylinders, shaft bases, CEA shroud base, CEA shroud flow channel, CEA shroud flow channel cap, CEA shroud shaft retention pin, CEA shroud retention block, external spanner nut, internal spanner nut, CEA shroud fasteners, CEA shroud flow channel extension, CEA shroud tube, core shroud plates, plates, ribs, intermediate plates, core shroud guide lugs, CSB alignment keys, CSB assembly dowel pin, CSB lifting bolt insert, CSB lower flange, CSB lug, CSB nozzle, CSB cylinder, CSB upper flange, guide tubes, ICI thimble support plate assembly, ICI support plate, grid, lifting support, lifting plate, column, plates, funnel, pad, ring, nipple, hex bolt, spacer, threaded rod, hex jam nut, thimble support nut, cap screws, bottom plate, bottom plate manhole cover, and cylinder.

2.3.1.2.2 Staff Evaluation

The staff reviewed LRA Section 2.3.1.2, Table 2.3.1-2, and SAR Section 4.2.2 to determine whether the applicant identified the reactor vessel internals within the scope of license renewal and subject to AMR, in accordance with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a). The staff used the evaluation methodology described in Section 2.3 of this SER. The staff conducted its review in accordance with the guidance described in Section 2.3 of the SRP-LR.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR, in accordance with the requirements of 10 CFR 54.4(a), to determine that the applicant did not inadvertently omit from the scope of license renewal any reactor vessel components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed the reactor vessel components that the applicant identified as within the scope of license renewal to determine that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.1.2, Table 2.3.1.2-2, the staff identified an area in which it needed additional information to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated April 23, 2004, the staff issued an RAI concerning the exclusion of the CSB snubber bolts to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4 (a) and the screening criteria of 10 CFR 54.21(a)(1).

Based on its position that the CSB snubber bolts serve as a pressure boundary and the bolts should be within the scope of license renewal, the staff requested justification for the exclusion

of the component. In its response dated May 24, 2004, the applicant stated that it inadvertently omitted the CSB snubber bolts from the LRA but will include them in the LRA. The staff finds this acceptable.

On the basis of its review, the staff found that the applicant has identified those portions of the RCS that meet the scoping requirements of 10 CFR 54.4(a) and has included those portions of the system within the scope of license renewal in LRA Section 2.3.1.1. The applicant has also included RCS components that are subject to an AMR, in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). The staff identified one omission.

2.3.1.2.3 Conclusion

During its review of the information provided in the LRA, license renewal drawings, and licensing basis information, the staff identified the omission of CSB snubber bolts. Subsequently, the applicant included the CSB snubber bolts in the scoping and screening results for reactor vessel components. The staff determined that this error was not indicative of a flawed scoping and screening methodology. Therefore, the staff concludes that the applicant has adequately identified the reactor coolant components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the RCS SCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.1.3 Class 1 Piping, Valves, and Reactor Coolant Pumps

2.3.1.3.1 Summary of Technical Information in the Application

In Section 2.3.1.3 of the LRA, the applicant described Class 1 piping, valves, and reactor coolant pumps (RCPs). The following RCS Class 1 piping and associated pressure boundary components are subject to an AMR:

- hot- and cold-leg straight sections and elbows
- surge line straight sections and elbows
- spray line, safety injection, pressurizer safety/relief, and letdown piping straight sections and elbows
- vent, drain, and sampling piping straight sections and elbows
- reactor vessel leak detection lines
- charging, letdown, and drain nozzles
- safety injection nozzles
- resistance temperature detector (RTD), replacement pressure nozzles, and pressure measurement and sampling nozzles
- nozzle thermal sleeves

- nozzle safe ends and inserts
- safety injection and charging nozzle thermal sleeves
- welds
- flow orifices
- reactor coolant pumps
- valves

Certain Class 1 valve subcomponents are not subject to an AMR because they are not passive components (i.e., performance of their intended functions requires moving parts or a change in configuration). These include the valve disks, stems, yokes, and operators. Pressure-retaining portions of Class 1 valves consist of the valve body bonnet and closure bolting.

The principle pressure boundary subcomponents of the RCPs include the casing, cover/thermal barrier, driver mount assembly, heat exchanger, seal cartridge, and studs/nuts. Although the pump seal cartridges are part of the pressure boundary and are within the scope of license renewal, an AMR is not required since the seal cartridges are periodically monitored, inspected, and replaced. The remaining RCP subcomponents are not subject to an AMR since they do not perform their intended functions without moving parts. These items include the impeller, shaft and journal, radial bearing, and coupling.

This section includes small portions of RCS instrumentation and sampling tubing, such as reactor coolant pressure boundary items (valves and tubing) downstream of instrument root valves.

In Table 2.3.1-3 of the LRA, the applicant listed the Class 1 piping, valve, and RCP component types that are within the scope of license renewal and subject to an AMR, including charging inlet nozzle, safety injection nozzle, surge line nozzle, charging inlet nozzle safe end, drain nozzle safe ends, letdown nozzle safe ends, pressure measurement nozzle safe end, sampling nozzle safe end, charging inlet nozzle thermal sleeve, safety injection nozzle thermal sleeve, surge line thermal sleeve, Class 1 boundary orifices, Class 1 pipe and fittings (nominal pipe size (NPS) less than 4"), Class 1 pipe (NPS less than 4"), Class 1 fittings, cold-leg piping and elbows, hot-leg piping and elbows, drain nozzles, letdown nozzles, shutdown cooling outlet nozzle, spray nozzle, pressure measurement nozzle, replacement pressure nozzle, sampling nozzle, RCP safe ends, RTD nozzles, safety injection nozzle safe end, shutdown cooling outlet nozzle safe end, surge nozzle safe end, stainless steel bolting, surge line pipe and elbows, surge line piping RTD nozzles and sampling nozzles, carbon/alloy steel bolting, valve bodies and bonnets, Class 2 and 3 closure bolting, Class 2 and 3 fittings, Class 2 and 3 pipe, Class 2 and 3 valve bodies and bonnets, tubing, RCP, RCP casing, RCP cover, RCP cover studs, RCP cover nuts, RCP driver mount assembly, RCP thermal barrier heat exchanger inner coil, RCP thermal barrier heat exchanger, outer coil, and RCP thermal barrier bored hole heat exchanger.

2.3.1.3.2 Staff Evaluation

The staff reviewed LRA Section 2.3.1.3, Table 2.3.1-3, and SAR Sections 5.5.3, 5.5.12, and 5.5.13 to determine whether the applicant identified the Class 1 piping, valves, and RCPs within the scope of license renewal and subject to AMR, in accordance with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a). The staff used the evaluation methodology described in Section 2.3 of this SER. The staff conducted its review in accordance with the guidance described in Section 2.3 of the SRP-LR.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR, in accordance with the requirements of 10 CFR 54.4(a), to determine that the applicant did not inadvertently omit from the scope of license renewal any Class 1 piping, valves, and RCP components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed the RCS components that the applicant identified as within the scope of license renewal to determine that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.1.3.3 Conclusion

During its review of the information provided in the LRA, license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for Class 1 piping, valves, and RCPs. Therefore, the staff concludes that the applicant has adequately identified the reactor vessel components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the reactor vessel system SCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.1.4 Pressurizer

2.3.1.4.1 Summary of Technical Information in the Application

In Section 2.3.1.4 of the LRA, the applicant described the pressurizer. The pressurizer pressure boundary items include the vessel, attached nozzles, and safe ends out to the connection with RCS piping. Section 2.3.1.3 discusses valves (i.e., safety and relief), instrument lines, and other piping connected to the pressurizer. The following pressurizer subcomponents support the RCS pressure boundary and are subject to an AMR:

- upper and lower shell, upper head
- lower head (including internal integral attachment for heater support plates)
- manway assembly (including cover plate, gasket retainer plate, studs, and nuts)
- pressurizer surge, spray, and safety/relief nozzles and safe ends
- temperature, pressure, level nozzles, and safe ends
- nozzle inserts, flanges, and thermal sleeves
- heater sheath, sleeve, and end plug
- heater support plates and bolting
- heater penetration plugs
- pressurizer support skirt

The following pressurizer subcomponents are not subject to an AMR since they do not support an intended function of the pressurizer, do not perform intended functions without moving parts or a change in configuration, or are considered consumable items:

- spray head reducer assembly, bolting, nozzle, and hex nut
- gaskets (spray nozzle, mechanical nozzle seal assemblies)
- surge nozzle screen assemblies
- heater elements

In 2002, the applicant repaired six pressurizer heater sleeves using mechanical nozzle seal assemblies (MNSAs). These assemblies replace the function of the partial penetration J-groove welds that attach the heater sleeves to the pressurizer, moving the reactor coolant pressure boundary to the pressurizer exterior surface. The MNSAs consist of two split-seal/flange assemblies placed in a counter-bore around the leaking heater sleeve. The seal is held under compression by a compression collar, which is held in place by threaded rods placed into holes drilled and tapped into the bottom head of the pressurizer. The MNSA items subject to an AMR include the compression collar, the upper flanges, and the bolting (threaded rods, nuts, and washers).

The intended function of the pressurizer components is to maintain the pressure boundary so that the RCS may perform its system functions for the period of extended operation. However, the pressurizer components also have a second intended function of RCS pressure control. The pressurizer components provide RCS pressure control for mitigation of a feedwater line break with ac available, as described in SAR Section 15.1.14.2.2.2. However, the most limiting feedwater line break is without ac power available, and the pressurizer sprays are not credited to mitigate that event. Therefore, RCS pressure control using the pressurizer sprays is not an intended function of the pressurizer. Pressurizer heaters are required to maintain subcooling following the loss of offsite power, as described in SAR Section 5.5.10.2. However, the electrical heater elements are active and not subject to an AMR.

In Table 2.3.1-4 of the LRA, the applicant listed the pressurizer component types that are within the scope of license renewal and subject to an AMR, including heater end plug, heater sheaths, heater sleeves, heater support channel, heater support plates, heater support plate brackets, heater support plate bracket bolts, lower head, lower shell, upper shell, upper head, lower level nozzle, manway cover bolts/studs, manway cover plate, manway forging, manway gasket retainer plate, MNSA bolting (studs, nuts, and washers), MNSA compression collar, MNSA upper flanges, pressure measurement nozzle, upper level nozzle, vent nozzle, temperature nozzle, pressure measurement nozzle safe end, upper/lower level nozzle safe end, temperature nozzle safe end, vent nozzle safe end, safety valve nozzle, spray nozzle, surge nozzle, safety valve nozzle flange, spray nozzle safe end, spray nozzle thermal sleeve, surge nozzle thermal sleeve, support skirt, and surge nozzle safe end.

2.3.1.4.2 Staff Evaluation

The staff reviewed LRA Section 2.3.1.4, Table 2.3.1-4, and SAR Section 5.5.10 to determine whether the applicant identified the pressurizer, associated components, and supporting structures within the scope of license renewal and subject to AMR, in accordance with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a). The staff used the evaluation

methodology described in Section 2.3 of this SER. The staff conducted its review in accordance with the guidance described in Section 2.3 of the SRP-LR.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR, in accordance with the requirements of 10 CFR 54.4(a), to determine that the applicant did not inadvertently omit from the scope of license renewal any pressurizer components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed the pressurizer components that the applicant identified as within the scope of license renewal to determine that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1). In reviewing LRA Section 2.3.1.1, the staff identified an area in which it needed additional information to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated April 23, 2004, the staff issued an RAI concerning the use of pressurizer sprays to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4 (a) and the screening criteria of 10 CFR 54.21(a)(1).

The staff asked the applicant to clarify whether it took credit for the sprays in the accident analysis. In its response, dated May 24, 2004, the applicant stated that it assumed pressurizer spray to function in order to establish the worst conditions for the analysis, but it did not credit the spray in the feedwater line break analysis or include it within the scope of LRA. The staff finds this acceptable.

The applicant confirmed in a letter dated May 27, 2004, that the pressurizer relief valve discharge piping and quench tank are within the scope and are identified in LRA Table 2.3.3-11 as "piping" and "tank," as required by 10 CFR 54.4(a)(2). The staff finds this acceptable.

On the basis of its review, the staff found that the applicant has identified those portions of the pressurizer that meet the scoping requirements of 10 CFR 54.4(a) and has included those portions of the system within the scope of license renewal in LRA Section 2.3.1.1. The applicant has also included pressurizer system components that are subject to an AMR, in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.1.4.3 Conclusion

During its review of the information provided in the LRA, license renewal drawings, and licensing basis information, the staff did not identify any omission or discrepancies in the applicant's scoping and screening results for the pressurizer. Therefore, the staff concludes that the applicant has adequately identified the pressurizer system SCs that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the pressurizer system SCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.1.5 Steam Generators

2.3.1.5.1 Summary of Technical Information in the Application

In Section 2.3.1.5 of the LRA, the applicant described the steam generators. The following ANO-2 steam generator components are subject to an AMR:

- tube plate
- U-tubes
- channel head
- channel head divider plate
- primary manway cover and insert plate
- primary nozzles, safe ends, and closure rings
- bolting
- tube support plates
- wrapper
- antivibration bars, bar end caps, and end cap welds
- U-bend peripheral retaining rings, retainer bars, retainer bar welds
- feedwater and steam outlet nozzle
- upper and lower shell barrels, elliptical heads, and transition cones
- feedwater thermal sleeves
- secondary manway covers
- hand hole covers
- inspection port covers and diaphragms
- blowdown and sampling nozzles
- instrument taps
- stay rods, spacer pipes, and hex nuts
- integral flow restrictors (venturis)
- snubber lugs and key brackets
- tube plugs

The following steam generator components are not subject to an AMR since they do not support an intended function of the steam generator or are considered consumable items:

- gaskets
- primary and secondary moisture separation equipment and associated supports and decking
- sludge collector assembly
- feedwater distribution ring pipe and fittings

The steam generator intended functions which form the basis for inclusion into the scope of license renewal include maintenance of the primary pressure boundary, maintenance of the secondary pressure boundary, heat transfer from the primary fluid to the secondary fluid, and flow control.

In Table 2.3.1-5 of the LRA, the applicant listed the steam generator component types that are within the scope of license renewal and subject to an AMR, including channel head, primary inlet nozzle, primary nozzle safe ends, primary outlet nozzle, channel head divider plate, primary bolting (studs, closure nuts and washers, and screws), primary manway cover, primary manway insert plate, primary nozzle closure rings, tube plate, tube plugs, U-tubes, 3" inspection port cover, 3" inspection port diaphragms, 6" inspection port cover, 8" hand hole cover, antivibration bars, tube support plates, antivibration bar end caps, peripheral retaining rings, U-bend, U-shaped retainer bars, blowdown and sampling nozzles, narrow- and wide-range water-

level taps, elliptical head, transition cone, upper and lower shell barrels, feedwater inlet nozzles, feedwater thermal sleeve, flow limiting insert (integral flow restrictors (venturis)), key bracket, snubber lug, secondary bolting (studs, closure washers, and nuts), secondary manway cover, steam outlet nozzle, tube bundle support system (stay rods, stay rod hex nuts, spacer pipes, and peripheral backup bars), wrapper, and wrapper jacking screws.

2.3.1.5.2 Staff Evaluation

The staff reviewed LRA Section 2.3.1.5, Table 2.3.1-5, and SAR Section 5.5.10 to determine whether the applicant identified the steam generator, associated components, and supporting structures within the scope of license renewal and subject to AMR, in accordance with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a). The staff used the evaluation methodology described in Section 2.3 of this SER. The staff conducted its review in accordance with the guidance described in Section 2.3 of the SRP-LR.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR, in accordance with the requirements of 10 CFR 54.4(a), to determine that the applicant did not inadvertently omit from the scope of license renewal any steam generator components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed the steam generator components that the applicant identified as within the scope of license renewal to determine that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1). In reviewing LRA Section 2.3.1.1, the staff identified an area in which it needed additional information to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated April 23, 2004, the staff issued an RAI concerning the internal feedwater distribution ring and the thermal sleeve connecting the header and the nozzle to determine whether the applicant has properly applied the scooping criteria of 10 CFR 54.4 (a) and the screening criteria of 10 CFR 54.21(a)(1).

The staff requested the licensee to provide the bases for the exclusion of feedwater distribution ring and the thermal sleeve from the scope of license renewal. In its response dated May 25, 2004, the applicant stated that the internal feedwater distribution ring and the thermal sleeve connecting the header and the nozzle do not perform the pressure boundary function of the steam generators. The staff finds this acceptable.

On the basis of its review, the staff found that the applicant has identified those portions of the steam generator that meet the scooping requirements of 10 CFR 54.4(a) and has included those portions of the system within the scope of license renewal in LRA Section 2.3.1.1. The applicant has also included steam generator components that are subject to an AMR, in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.1.5.3 Conclusion

During its review of the information provided in the LRA, license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scooping and screening results for the steam generator. Therefore, the staff concludes that the applicant has adequately identified the steam generator components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the reactor vessel system SCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.2 Engineered Safety Features Systems

In Section 2.3.2 of the LRA, the applicant identified the SCs of the engineered safety features that are subject to an AMR for license renewal. Chapter 6 of the SAR describes the engineered safety features. This section includes the following systems:

- emergency core cooling
- containment spray system
- containment cooling
- containment penetrations
- hydrogen control

2.3.2.1 Emergency Core Cooling

2.3.2.1.1 Summary of Technical Information in the Application

In Section 2.3.2.1 of the LRA, the applicant described the emergency core cooling system (ECCS). The ECCS provides core cooling and core reactivity control under accident conditions, including a loss-of-coolant accident (LOCA) or a main steamline break. Following a LOCA, the cooling must prevent fuel melting or significant alteration of core geometry, limit the cladding metal-water reaction, and remove the energy generated in the core for an extended period of time. In the unlikely event of a main steamline break, the ECCS injects borated water into the RCS to prevent fuel damage and to increase the shutdown margin of the core.

The major ECCS subsystems are the high-pressure safety injection (HPSI), low-pressure safety injection (LPSI), and safety injection tanks. The LPSI system consists of two pumps that discharge into a combined low-pressure header that has a return connection from the shutdown cooling heat exchangers. The HPSI system has three electric motor-driven pumps installed in parallel. Two high-pressure injection headers and eight motor-operated injection valves connect the pumps to the four injection points on the RCS loop cold legs. The LPSI and HPSI pumps are designed to take suction initially from the refueling water tank (RWT) and inject water into the RCS to provide core cooling. Injection piping and valves connect the safety injection tanks, containing borated water pressurized with nitrogen, to the RCS.

Section 2.3.1 of this SER evaluates the Class 1 components of the ECCS with the RCS. Section 2.3.3.5 of this SER evaluates certain components classified with the HPSI system, which are part of the chemical and volume control system (CVCS) charging lines at the interface with the injection headers. The LPSI system contains nonsafety-related components whose failure could impact safety-related components. Therefore, the ECCS is within the

scope of license renewal based on the criteria of 10 CFR 54.4(a)(2). Section 2.3.3.11 of this SER evaluates these components.

The ECCS evaluation includes the CVCS valve in the supply from the RWT and primary sampling system components associated with ECCS.

The LPSI pumps, shutdown cooling heat exchangers, and associated equipment in the flow path are credited with RCS decay heat removal for safe shutdown after a fire. The "B" HPSI pump and injection valves in the HPSI system are credited with reactor coolant inventory maintenance for safe shutdown after a fire. These components perform functions that demonstrate compliance with the Commission's regulations for fire protection (10 CFR 50.48).

The ECCS is within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1–3).

In Table 2.3.2-1 of the LRA, the applicant listed the ECCS component types that are within the scope of license renewal and subject to an AMR, including bearing housing, bolting, heat exchanger (shell), heat exchanger (tubes), nozzle, orifice, piping, pump casing, tank, thermowell, tubing, and valves.

2.3.2.1.2 Staff Evaluation

The staff reviewed LRA Section 2.3.2.1, Table 2.3.2-1, and SAR Section 6.3 to determine whether the applicant identified the ECCS subsystems (e.g., piping, tanks, and pump casing) and supporting structures that are within the scope of license renewal and subject to AMR, in accordance with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a). The staff used the evaluation methodology described in Section 2.3 of this SER. The staff conducted its review in accordance with the guidance described in Section 2.3 of the SRP-LR.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR, in accordance with the requirements of 10 CFR 54.4(a), to determine that the applicant did not inadvertently omit from the scope of license renewal any ECCS components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed the ECCS components that the applicant identified as within the scope of license renewal to determine that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.2.1.3 Conclusion

During its review of the information provided in the LRA, license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scooping and screening results for ECCS. Therefore, the staff concludes that the applicant has adequately identified the reactor vessel components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the reactor vessel system SCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.2.2 Containment Spray System

2.3.2.2.1 Summary of Technical Information in the Application

In Section 2.3.2.2 of the LRA, the applicant described the containment spray system. The containment spray system provides spray cooling water to the containment atmosphere following a LOCA or main steamline break inside containment. This cooling water limits the peak pressure in containment to below containment design pressure. The containment spray system also removes radioactive iodine from the containment atmosphere during a LOCA.

The containment spray system consists of two independent flow trains. Each train includes a pump, heat exchanger, and sets of spray nozzles and ring headers, with associated piping, valves, and instrumentation necessary for operation. The RWT provides the source of borated water to the containment spray system during the injection phase of an accident. Once the RWT is exhausted, the containment spray system takes suction from the water accumulated in the containment recirculation sump.

The RWT, which is included in the containment spray system boundary, provides a source of borated water for the ECCS and the containment spray system during postaccident operations. The containment sump header mechanical components are reviewed with the containment spray system. This system includes the shutdown cooling heat exchangers since they cool the spray water under accident conditions.

This system contains nonsafety-related components whose failure could impact safety-related components. Section 2.3.3.11 of this SER evaluates these components.

Portions of the containment spray system, such as the RWT and the components necessary for shutdown cooling operation, are required for compliance with the Commission's regulations for fire protection (10 CFR 50.48). The containment spray system is within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1), 10 CFR 54.4(a)(2), and 10 CFR 54.4(a)(3).

In Table 2.3.2-2 of the LRA, the applicant listed the containment spray system component types that are within the scope of license renewal and subject to an AMR, including bolting, filter housing, heat exchanger (shell), heat exchanger (tubes), heat exchanger (tubesheet), heater housing, nozzle, orifice, piping, pump casing, tank, thermowell, tubing, valves, and vortex breaker.

2.3.2.2.2 Staff Evaluation

The staff reviewed LRA Sections 2.3.2.2 and 2.3.3.11 and ANO-2 UFSAR Section 6.2.2 using the evaluation methodology described in Section 2.1 of this SER. The staff conducted its review in accordance with the guidance described in Section 2.3 of the SRP-LR.

In conducting the review, the staff reviewed the system functions described in the LRA and the UFSAR, in accordance with the requirements of 10 CFR 54.4(a), to determine that the applicant did not inadvertently omit from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those that the applicant identified as within the scope of license renewal to determine that the applicant did not omit any

passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff found that the applicant included those portions of the containment spray system that meet the scoping requirements of 10 CFR 54.4 within the scope of license renewal and identified them as such in LRA Section 2.3.2.2. The staff also found that LRA Table 2.3.2-2 includes the containment spray system components that are subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.2.2.3 Conclusion

During its review of information provided in the LRA, license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the SCs of the containment spray system. Therefore, the staff concludes that the applicant has adequately identified the containment spray system SCs that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the containment spray system SCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.2.3 Containment Cooling

2.3.2.3.1 Summary of Technical Information in the Application

In Section 2.3.2.3 of the LRA, the applicant described the containment cooling system (CCS). The CCS provides cooling and air circulation inside containment. It reduces the containment pressure and temperature after a postulated LOCA or main steamline break by removing thermal energy from the containment atmosphere. This also lowers offsite radiation levels by minimizing the pressure differential between the containment atmosphere and the outside atmosphere, thereby reducing the driving force for leakage of fission products from containment.

The CCS is an AMR system (see Section 2.2 of this SER) that includes system codes reactor building heating and ventilation (RBHV) and reactor building purge air. Section 2.3.2.5 of this SER evaluates the hydrogen recombiners with the hydrogen control system.

The RBHV system provides cooling and heating to containment during power operation, plant shutdown, and accident conditions. The RBHV system consists of the containment cooling units (including fans, chilled water cooling coils, and service water cooling coils), the containment recirculation fans (which are evaluated with the hydrogen control system in Section 2.3.2.5 of this SER), nonsafety-related CEDM shroud cooling units, and nonsafety-related reactor cavity cooling fans. The RBHV system contains safety-related components and is therefore within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1). This system contains nonsafety-related components whose failure could impact safety-related components and is therefore within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(2). Section 2.3.3.11 evaluates these components.

The reactor building purge air system provides outside air to purge the containment building during plant shutdown for personnel access. The purge air system consists of fans, filters, and associated piping and valves. The system has the safety function of containment isolation for

the purge penetration and is therefore within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1).

The CCS is within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1) and 10 CFR 54.4(a)(2).

In Table 2.3.2.3 of the LRA, the applicant listed the CCS component types that are within the scope of license renewal and subject to an AMR, including blower housing, bolting, cooling coil assembly, cooling coil housing, damper housing, ductwork, piping, and valve.

2.3.2.3.2 Staff Evaluation

The staff reviewed LRA Sections 2.1.1, 2.3.2.3, and 2.3.3.11 and ANO-2 UFSAR Sections 9.4.2 and 6.2.2 using the evaluation methodology described in Section 2.1 of this SER. The staff conducted its review in accordance with the guidance described in Section 2.3 of the SRP-LR.

In conducting the review, the staff reviewed the system functions described in the LRA and UFSAR, in accordance with the requirements of 10 CFR 54.4(a), to determine that the applicant did not inadvertently omit from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4 (a). The staff then reviewed those that the applicant identified as within the scope of license renewal to determine that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Sections 2.1.1, 2.3.2.3, and 2.3.3.11, the staff identified an area in which it needed additional information to complete the review of the applicant's scoping and screening results. Therefore, by letter dated April 8, 2004, the staff issued RAIs, described below, concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1).

RAI 2.3-1a

The staff requested that the applicant determine that the LRA has not omitted any CCS (RBHV system and purge air system) SCs that should be within the scope of license renewal according to 10 CFR 54.4(a).

Applicant's Response and Staff's Evaluation

In its response, dated May 19, 2004, the applicant stated that, in accordance with 10 CFR 54.21(a)(1), CCS (RBHV system and purge air system) SCs subject to an AMR are those that perform an intended function without moving parts or a change in configuration or properties (i.e., passive) and that are not subject to replacement based on a qualified life or specified time period (i.e., long-lived). Within the systems and structures within the scope of license renewal, the applicant identified CCS (RBHV system and purge air system) SCs that are subject to an AMR, in accordance with 10 CFR 54.21, in LRA Tables 2.2-1a, 2.2-1b, and 2.2-3. The applicant conservatively considered these SCs to be within the scope of license renewal for the purpose of identifying SCs that are subject to an AMR.

Based on its review, the staff finds the applicant's response to RAI 2.3-1a acceptable, because the applicant considered all components within the CCS (RBHV system and purge air system), as identified in LRA Tables 2.2-1a and 2.2-1b, and all CCS (RBHV system and purge air system) structures identified in LRA Table 2.2-3, to be within the scope of license renewal for the purpose of identifying SCs that are subject to an AMR. Therefore, the staff's concern described in RAI 2.3-1a is resolved.

RAI 2.3-2

In Section 2.1.1 of the LRA, the applicant stated that it prepared LRA drawings (for the RBHV system) to indicate components subject to an AMR; components for the CCS (RBHV system and purge air system) that are subject to an AMR based only on the criteria of 10 CFR 54.4(a)(2) are not indicated on the LRA drawings for the CCS (RBHV system and purge air system). The staff requested that the applicant determine that the LRA has not omitted any CCS (RBHV system and purge air system) SCs that should be within the scope of license renewal, according to 10 CFR 54.4(a).

Applicant's Response and Staff's Evaluation

In its response, dated May 19, 2004, the applicant stated that, in accordance with 10 CFR 54.21(a)(1) and as stated in the response to RAI 2.1.1-2, it considered all components for the CCS (RBHV system and purge air system) within the systems identified in LRA Tables 2.2-1a and 2.2-1b and all structures for the CCS (RBHV system and purge air system) identified in LRA Table 2.2-3 to be within the scope of license renewal for the purpose of identifying SCs for the CCS (RBHV system and purge air system) that are subject to AMR, including components in the system considered only for 10 CFR 54.4(a)(2).

Based on its review, the staff finds the applicant's response to RAI 2.3-2 acceptable, because the applicant considered all components within the CCS (RBHV system and purge air system) as identified in LRA Tables 2.2-1a and 2.2-1b, and all CCS (RBHV system and purge air system) structures identified in LRA Table 2.2-3, to be within the scope of license renewal for the purpose of identifying SCs that are subject to AMR. Therefore, the staff's concern described in RAI 2.3-2 is resolved.

2.3.2.3.3 Conclusion

During its review of information provided in the LRA, license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the SCs of the CCS (RBHV system and purge air system). Therefore, the staff concludes that the applicant has adequately identified the CCS (RBHV system and purge air system) SCs that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the CCS (RBHV system and purge air system) SCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.2.4 Containment Penetrations

2.3.2.4.1 Summary of Technical Information in the Application

In Section 2.3.2.4 of the LRA, the applicant described the containment penetrations system. The containment penetrations system isolates fluid systems that pass through containment penetrations so as to confine radioactivity released following an accident to the containment. For license renewal, the containment penetrations system includes the passive mechanical penetration components that are not included in another system AMR. In general, if a system has its own system-level AMR, then the associated containment penetrations are reviewed with that system and not in this section.

This grouping of containment isolation components from various plant systems into one consolidated review is appropriate, as indicated in Section 2.1.3.1 of the SRP-LR, which states, "An applicant may take an approach in scoping and screening that combines similar components from various systems. For example, containment isolation valves from the various systems may be identified as a single system for the purpose of license renewal." Section V.C, "Containment Isolation Components," of the GALL Report recognizes the grouping and states, "The system consists of isolation barriers in lines for BWR and PWR non-safety systems such as the plant heating, waste gas, plant drain, liquid waste, and cooling water systems."

Containment penetrations are designed to provide at least a double barrier to the escape of radioactive material at each fluid penetration through the containment liner plate. Double barriers are provided to ensure that no single, credible failure or malfunction of an active or passive system component can result in loss of isolation or significant leakage.

The electrical penetration nitrogen pressurization system provides continuous pressurization of the electrical penetrations with the highest purity nitrogen. The system consists of two sets of three seismically mounted nitrogen bottles, isolation valves, pressure relief valves, tubing, and instrumentation.

Components in the steam generator sample and blowdown penetrations are required for safe shutdown following a fire (10 CFR 50.48).

The containment penetrations system is within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1) and 10 CFR 54.4(a)(3).

In Table 2.3.2-4 of the LRA, the applicant listed the containment penetration system component types that are within the scope of license renewal and subject to an AMR, including bolting, flex hose, piping, tubing, and valve.

2.3.2.4.2 Staff Evaluation

The staff reviewed LRA Section 2.3.2.4 and ANO-2 UFSAR Section 6.2.4 and Table 6.2-26 using the evaluation methodology described in Section 2.1 of this SER. The staff conducted its review in accordance with the guidance described in Section 2.3 of the SRP-LR.

In conducting the review, the staff reviewed the system functions described in the LRA and UFSAR, in accordance with the requirements of 10 CFR 54.4(a), to determine that the applicant

did not inadvertently omit from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4 (a). The staff then reviewed those that the applicant identified as within the scope of license renewal to determine that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff found that the applicant included those portions of the containment penetration system that meet the scoping requirements of 10 CFR 54.4 within the scope of license renewal and identified them as such in LRA Section 2.3.2.4. Table 2.3.2-4 of the LRA includes the containment penetration system's components that are subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.2.4.3 Conclusion

During its review of information provided in the LRA, license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the SCs of the containment penetration system. Therefore, the staff concludes that the applicant has adequately identified the containment penetration system SCs that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the containment penetration system SCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.2.5 Hydrogen Control

2.3.2.5.1 Summary of Technical Information in the Application

In Section 2.3.2.5 of the LRA, the applicant described the hydrogen control system. The hydrogen control system limits the hydrogen gas concentration inside containment following a LOCA. To assure that containment integrity is maintained, the hydrogen control system has the following safety functions:

- removing hydrogen gas from the containment building atmosphere after a LOCA to maintain the concentration of gases below the limits of flammability
- providing a direct reading of the concentration of hydrogen gas concentration in the containment building

The hydrogen control system is an AMR system (see Section 2.2 of this SER), which includes components from system codes hydrogen purge, hydrogen recombiners, RBHV, and radiation monitoring system. As described in the SAR, these systems are the containment atmosphere monitoring system, the hydrogen recombiner system, and the containment air recirculation system.

The ANO-2 design originally included a hydrogen purge system that was intended to release the postaccident containment atmosphere and reduce the hydrogen concentration by adding air to containment. Since hydrogen recombiners are now used, a number of components are spared in place. The hydrogen purge system includes valves that were originally intended to supply service water under accident conditions to the purge components but now have only the

safety function of maintaining the service water pressure boundary. Section 2.3.3.8 of this SER evaluates these valves with the service water system.

The hydrogen recombiners are evaluated as an electrical system (see LRA Table 2.2-1b).

The hydrogen control system is within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1).

In Table 2.3.2-5 of the LRA, the applicant listed the hydrogen control system component types that are within the scope of license renewal and subject to an AMR, including bolting, filter housing, heat exchanger (shell), heat exchanger (tubes), orifice, piping, pump casing, tubing, and valve.

2.3.2.5.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.5 and ANO-2 UFSAR Section 6.2.5 using the evaluation methodology described in Section 2.1 of this SER. The staff conducted its review in accordance with the guidance described in Section 2.3 of the SRP-LR.

In conducting the review, the staff reviewed the system functions described in the LRA and UFSAR, in accordance with the requirements of 10 CFR 54.4(a), to determine that the applicant did not inadvertently omit from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those that the applicant identified as within the scope of license renewal to determine that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.2.5, the staff identified an area in which it needed additional information to complete the review of the applicant's scoping and screening results. Therefore, by letter dated April 8, 2004, the staff issued an RAI, described below, concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1).

RAI 2.3-5

The staff indicated that LRA Table 2.3.2-5 for hydrogen control system components subject to an AMR does not list separators 2F-254 and 2F-256, shown on ANO-2 P&ID LRA—2261 Sheet 3, as components requiring an AMR. The staff requested that the applicant identify where the LRA addresses the AMR for these components or justify their exclusion from an AMR.

Applicant's Response and Staff's Evaluation

In its response, dated May 19, 2004, the applicant stated that separators 2F-254 and 2F-256 are subject to an AMR and are included under the component type "filter housing" in LRA Table 2.3.2-5.

Based on its review, the staff found the applicant's response to RAI 2.3-5 acceptable, because the applicant considered all components within the hydrogen control system, as identified in

LRA Section 2.3.2.5, and all hydrogen control system structures identified in LRA Table 2.3.2-5, to be within the scope of license renewal for the purpose of identifying SCs that are subject to AMR. Therefore, the staff considers its concern described in RAI 2.3-5 resolved.

2.3.2.5.3 Conclusion

During its review of information provided in the LRA, license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the SCs of the hydrogen control system. Therefore, the staff concludes that the applicant has adequately identified the hydrogen control system SCs that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the hydrogen control system SCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.3 Auxiliary Systems

In Section 2.3.3 of the LRA, the applicant identified the components of the auxiliary systems that are subject to an AMR for license renewal. This section includes the following systems:

- spent fuel pool
- water suppression fire protection
- emergency diesel generator
- alternate ac diesel generator
- chemical and volume control
- Halon fire protection and reactor coolant pump motor oil leakage collection
- fuel oil
- service water
- auxiliary building ventilation
- control room ventilation
- miscellaneous systems within scope for 10 CFR 54.4(a)(2)
- other miscellaneous systems

2.3.3.1 Spent Fuel Storage

2.3.3.1.1 Summary of Technical Information in the Application

In Section 2.3.3.1 of the LRA, the applicant described the spent fuel storage. The subsystems that make up the spent fuel pool system include fuel pool cooling and purification, spent fuel pool, and fuel handling.

The fuel pool cooling and purification subsystem removes decay heat from the stored spent fuel and maintains purity and optical clarity of the water in the spent fuel pool, the fuel transfer canal, and the refueling canal. The subsystem consists mainly of nonsafety-related fuel pool pumps, heat exchanger, filters, demineralizer, and associated piping and valves. The subsystem contains nonsafety-related components whose failure could impact safety-related components, and the system is therefore within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(2). Section 2.3.3.11 of this SER evaluates these components. The safety-related components evaluated with this subsystem include components associated with containment penetrations, a CVCS valve in the makeup to the spent fuel pool system, and

components associated with the service water supply to the spent fuel pool. If system cooling is lost, the seismic Class 1 service water system can provide water directly to the spent fuel pool to maintain the level, which will boil off to cool the spent fuel assemblies. The spent fuel pool cooling system piping and valves that supply service water to the spent fuel pool from the #1 service water loop are safety related. The redundant feed from the #2 service water loop feeds directly to the spent fuel pool and does not route through spent fuel pool cooling components.

The spent fuel pool subsystem stores new and spent fuel in a subcritical condition. Included in this subsystem are the spent fuel racks and the new fuel racks. The new and spent fuel pool racks are safety related and are required to support the fuel assemblies. Section 2.4.2 of this SER evaluates the new fuel racks as a structural component.

The fuel handling subsystem provides the capability of (1) underwater handling and transfer of spent fuel and control components removed from the reactor to the spent fuel pool, (2) movement of fuel and control components within the reactor vessel, and (3) movement of new fuel from the spent fuel pool to the reactor. The subsystem also provides the capability to move new fuel from shipping containers to new fuel storage or spent fuel storage.

The fuel handling subsystem consists of fuel handling equipment such as the fuel transfer tube, the spent fuel pool crane, upender assemblies, refueling machine, spent fuel machine, the new fuel elevator, and manual tools. The fuel transfer tube is a containment penetration and is therefore safety related. Some of the fuel handling cranes, evaluated in Sections 2.4.1 and 2.4.2 of this SER, are seismic Class 1 in the parked position. The safety-related fuel transfer tube gasket air test isolation valve is a service air system component which is evaluated with the spent fuel pool system.

The spent fuel pool system is within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1–2).

In Table 2.3.3-1 of the LRA, the applicant listed the spent fuel storage component types that are within the scope of license renewal and subject to an AMR, including bolting, fuel transfer tube, piping, spent fuel racks, and valve.

2.3.3.1.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.1, ANO-2 UFSAR Section 9.1, and site documentation in its scoping and screening review of the spent fuel pool system. The staff conducted its review, with the support from the plant audit and applicant's methodology described in Section 2.3 of this SER, in accordance with the guidance described in Section 2.3 of the SRP-LR.

In the performance of its review, the staff selected system functions described in the UFSAR, in accordance with the requirements of 10 CFR 54.4, and by reviewing site documentation to determine that the applicant did not inadvertently omit from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). In LRA Section 2.3.3.11, the applicant separately compiled all components with intended functions that are within the scope of license renewal, per 10 CFR 54.4(a)(2). The staff reviews those components for the spent fuel pool system in Section 2.3.3.11 of this SER. The staff then reviewed those components that the applicant identified as having an intended function to

determine that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

On March 1 to 5, 2004, the NRC staff performed a scoping and screening inspection at ANO-2. During a walkdown of the auxiliary building, the staff discovered a potential interaction between a portion of the spent fuel pool cooling system, which the applicant had determined was not in the scope of license renewal, and the emergency feedwater system (a safety-related system). In particular, the staff found that a breech of the pump casing of the spent fuel pool cooling pumps had the potential to spray two active components in the emergency feedwater system, potentially adversely affecting it's ability to perform its safety function. In accordance with 10 CFR Part 54, if the failure of a nonsafety-related component could prevent a safety-related function from being performed, that component should be in the scope of license renewal and subject to an aging management review. The applicant subsequently included these pump casings in their list of components in the spent fuel pool system requiring an aging management review.

The NRC staff inspection identified an item requiring action by the applicant. The item listed above is identified in the ANO-2 Inspection Report, dated April 19, 2004 (ML0411006481). The applicant indicated that the spent fuel pool cooling pump casings were included in an aging management program. The aging management review is discussed in Section 3.3.2.3.1. The final disposition of this item will be addressed by the Aging Management Review Inspection scheduled for November 1 - 19, 2004.

On the basis of its review, the staff found that, with the exception of the pump casings of the spent fuel pool cooling pumps, the applicant has identified those portions of the spent fuel pool system that meet the scoping requirements of 10 CFR 54.4 and included them within the scope of license renewal in LRA Section 2.3.3.1. The applicant has also included the spent fuel pool system components that are subject to an AMR, in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), in LRA Table 2.3.3-1.

2.3.3.1.3 Conclusion

During its review of the information provided in the LRA, site documentation, license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the components of the spent fuel pool system. During the scoping and screening inspection, the staff found that the applicant had omitted the spent fuel pool cooling pump casings from the scope of license renewal. The staff concluded that this was an isolated human error made in implementing the scoping and screening methodology, and not indicative of a flawed scoping and screening methodology. On the basis of its review, the staff concludes that the applicant has adequately identified the spent fuel pool system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the spent fuel pool system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.3.2 Water Suppression Fire Protection

2.3.3.2.1 Summary of Technical Information in the Application

In Section 2.3.3.2 of the LRA, the applicant described the water suppression fire protection system. The fire protection system protects plant personnel and equipment in the event of a fire to ensure the safe shutdown of the plant and to minimize the risk of a release of radioactive material to the environment. Overall fire protection features include fire suppression, fire detection and actuation, and fire barriers. The fire detection and actuation portion of the system is screened as part of the electrical and I&C system. Fire dampers are screened as part of the assigned HVAC system. Other passive fire barriers are screened as part of the structures.

The fire protection system includes both manual (e.g., use of hoses, portable extinguishers, and fixed systems by plant personnel) and automatically actuated fire suppression features. Depending on the area protected, the suppression system employs extinguishing agents consisting of water and/or Halon. The water suppression fire protection system includes the fire pumps (including the diesel-driven fire pump fuel oil and other auxiliary systems), the fire water distribution system (including outside loop yard mains, hydrants, hose stations, standpipes, and valves), and deluge and preaction sprinkler systems.

Portable fire protection equipment, such as fire hoses, fire extinguishers, carbon dioxide bottles, and self-contained breathing apparatus air bottles, is not subject to an AMR because it is considered short-lived, replaced on condition, and exempted from AMR consistent with the treatment of consumables.

Table 2.2-1a of the LRA lists the mechanical systems within the scope of license renewal, including the water fire suppression system. The applicant identified the 10 CFR 54.4(a)(1–3) fire protection regulated event criteria as the scoping criteria that were met by the fire protection system components which are within the scope of license renewal.

In Table 2.3.3-2 of the LRA, the applicant listed the fire protection component types that are within the scope of license renewal and subject to an AMR, including air dryer housing, blower housing, bolting, ductwork, expansion joint, filter, filter housing, flex hose, gear housing, governor housing, heat exchanger (housing), heat exchanger (shell), heat exchanger (tubes), heater housing, nozzle, orifice, pipe/fittings, piping, pump casing, tubing, and valve.

2.3.3.2.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.2 and ANO-2 UFSAR Section 9.5.1. The staff conducted its review, using the evaluation methodology described in Section 2.3 of this SER, in accordance with the guidance described in Section 2.3 of the SRP-LR.

In the performance of the review, the staff, using the scoping process described in Section 2.3 of this SER, reviewed the UFSAR to determine if the applicant failed to identify in the LRA any system functions, in accordance with the requirements of 10 CFR 54.4(a), as an intended function of the fire protection system. The staff then reviewed the LRA and UFSAR, in accordance with the screening process described in Section 2.3 of this SER, to determine that the applicant did not omit any passive and long-lived components from an AMR, in accordance with 10 CFR 54.21(a)(1).

The staff found that the applicant included those portions of the water suppression fire protection system that meet the scoping requirements of 10 CFR 54.4 within the scope of license renewal and identified them as such in LRA Section 2.3.3.2. Table 2.3.3-2 of the LRA includes the water suppression fire protection system components that are subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.3.2.3 Conclusion

The staff reviewed the LRA and the accompanying scoping boundary drawings to determine whether the applicant failed to identify any SSCs that should be within the scope of license renewal. The staff did not identify any omissions. In addition, the staff performed an independent assessment to determine if the applicant identified all components that should be subject to an AMR. The staff did not identify any omissions. On the basis of its review, the staff concludes that the applicant has adequately identified the components of the fire protection system that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the components of the fire protection system that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.3.3 Emergency Diesel Generator

2.3.3.3.1 Summary of Technical Information in the Application

In Section 2.3.3.3 of the LRA, the applicant described the EDG system. The EDG system provides redundant emergency power sources capable of furnishing adequate power to safely shut down the reactor, remove reactor residual heat, and maintain the unit in a safe-shutdown condition upon the loss of preferred power with or without a coincident design-basis event. The EDGs are the redundant emergency power sources. The EDG system consists of diesel generators and the starting air, cooling water, lubrication, and combustion air intake and exhaust subsystems. Section 2.3.3.7 of this SER evaluates the fuel oil storage and transfer subsystem associated with the EDG.

The system is the safety-related source of electrical power required for engineered safety feature loads during design-basis events. The system also provides the emergency power required for safe shutdown following a fire. The EDG system is therefore within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1) and 10 CFR 54.4(a)(3).

In Table 2.3.3-3 of the LRA, the applicant listed the EDG system component types that are within the scope of license renewal and subject to an AMR, including blower housing, bolting, booster housing, distributor housing, ejector, expansion joint, filter, filter housing, flex hose, governor housing, heat exchanger (bonnet), heat exchanger (shell), heat exchanger (tubes), heat exchanger (tubesheet), heater housing, orifice, piping, pump casing, silencer, tank, thermowell, tubing, unloader, and valve.

2.3.3.3.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.3, ANO-2 UFSAR Sections 8.3.1.1.7 and 9.5.5 through 9.5.9, and site documentation in its scoping and screening review of the EDG system. The staff conducted its review, with the support from the plant audit and applicant's methodology

described in Section 2.3 of this SER, in accordance with the guidance described in Section 2.3 of the SRP-LR.

In the performance of its review, the staff selected system functions described in the UFSAR, in accordance with the requirements of 10 CFR 54.4, and evaluated site documentation to determine that the applicant did not inadvertently omit from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). In LRA Section 2.3.3.11, the applicant separately compiled all components with intended functions that are within the scope of license renewal, per 10 CFR 54.4(a)(2). The staff reviews those components for the EDG system in Section 2.3.3.11 of this SER. The staff then reviewed those components that the applicant identified as having an intended function to determine that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.3 and site documentation, the staff identified an area in which it needed additional information to complete the review of the applicant's scoping and screening results. Therefore, by letter dated May 11, 2004, the staff issued an RAI, described below, to the applicant to determine whether it has properly applied the scoping criteria of 10 CFR 54.4(a).

RAI 2.3.3.3-1(a)

The staff identified several active components that are highlighted on license renewal drawings as subject to an AMR. For the EDG system, these include exhaust turbo chargers and EDG engines 2K-4A and 2K-4B. Table 2.3.3-3 of the LRA does not include these as components subject to an AMR. In LRA Section 2.1.1, the applicant stated that all components highlighted on license renewal boundary drawings are subject to an AMR. The staff requested that the applicant clarify if the highlighted active components are subject to an AMR. If so, the staff requested that the applicant justify their exclusion from LRA Table 2.3.3-3, or include the components in LRA Tables 2.3.3-3 and 3.3.2-3.

Applicant's Response and Staff's Evaluation

In its response dated June 10, 2004, the applicant stated that LRA Tables 2.3.3-3 and 3.3.2-3 show the passive portion of the turbo chargers as the component type "blower housing." The applicant also stated that EDG engines 2K-4A and 2K-4B, in accordance with Appendix B to NEI 95-10 and consistent with SRP-LR Table 2.1-5, are not subject to an AMR and as such should not be highlighted on the drawing.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.3-1(a) acceptable, because the turbo charger housings which are passive and long-lived are appropriately included within the scope and are subject to an AMR. As such, LRA Tables 2.3.3-3 and 3.3.2-3 include them as blower housings. The applicant made an error in highlighting the active components in question on the license renewal drawing; therefore, they are not subject to an AMR. This determination is acceptable. Therefore, the staff considers its concern described in RAI 2.3.3.3-1(a) resolved, as it relates to the EDG system.

2.3.3.3.3 Conclusion

During its review of the information provided in the LRA, site documentation, the license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the components of the EDG system. Therefore, the staff concludes that the applicant has adequately identified the EDG system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the EDG system components that are subject to AMR, as required by 10 CFR 54.21(a)(1).

2.3.3.4 Alternate ac Diesel Generator

2.3.3.4.1 Summary of Technical Information in the Application

In Section 2.3.3.4 of the LRA, the applicant described the alternate ac diesel generator system, which provides backup power at ANO. The alternate ac generator is a 4400-kilowatt (kW) diesel generator installed in response to the regulatory requirements of 10 CFR 50.63. The alternate ac system consists of a single diesel generator and the air start, engine cooling water, lubrication, combustion air intake and exhaust, fuel oil, and alternate ac building heating and ventilation subsystems. Ventilation components are part of the ventilation system code (VENT).

While it does not have a safety function, 10 CFR 50.63 requires the alternate ac generator system. The system is nonsafety related. The alternate ac generator system is credited for providing power during a loss of offsite power concurrent with a loss of the EDGs (i.e., SBO). The alternate ac diesel can furnish adequate power to safely shut down the reactor upon a loss of all ac power at ANO-2 by connecting to either of the 4160-V safety-related buses on the unit. The alternate ac diesel is also credited with providing electrical power for operation for safe shutdown after a fire. Therefore the alternate ac system is within the scope of license renewal, based on 10 CFR 54.4(a)(3), for the fire protection and SBO regulated events.

The alternate ac generator is shared with ANO, Unit 1 (ANO-1). To have a complete review of the components required for ANO-2 operation, the SER evaluates portions of the system that are required to support the supply of power to ANO-2 even if they have already been reviewed for ANO-1 license renewal.

In Table 2.3.3.4 of the LRA, the applicant listed the alternate ac diesel system component types that are within the scope of license renewal and subject to an AMR, including air motor housing, blower housing, bolting, expansion joint, filter, filter housing, flex hose, governor housing, heat exchanger (shell), heat exchanger (tubes), heater housing, indicator housing, lubricator housing, orifice, piping, pump casing, silencer, tank, thermowell, tubing, and valve.

2.3.3.4.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.4, ANO-2 UFSAR Section 8.3.3, and site documentation in its scoping and screening review of the alternate ac diesel generator system. The staff conducted its review, with the support from the plant audit and applicant's methodology described in Section 2.3 of this SER, in accordance with the guidance described in Section 2.3 of the SRP-LR.

In the performance of its review, the staff selected system functions described in the UFSAR, in accordance with the requirements of 10 CFR 54.4, and evaluated site documentation to confirm that the applicant did not inadvertently omit from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). In LRA Section 2.3.3.11, the applicant separately compiled scoping and screening results for all components with intended functions that are within the scope of license renewal, per 10 CFR 54.4(a)(2). The staff reviews those components for the alternate ac diesel generator system in Section 2.3.3.11 of this SER. The staff then reviewed those components that the applicant identified as having an intended function to determine that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.4 and site documentation, the staff identified areas in which it needed additional information to complete its evaluation of the applicant's scoping and screening results. Therefore, by letter dated May 11, 2004, the staff issued RAIs, described below, to the applicant concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1).

RAI 2.3.3.3-1(b)

The staff identified several active components that the applicant highlighted on the license renewal drawings as subject to an AMR. For the alternate ac generator system, these include cylinder block and head, piston cooling jets (housing), engine sump, bearings (housing), and turbo chargers. Table 2.3.3-4 of the LRA does not list these as components subject to an AMR. In LRA Section 2.1.1, the applicant stated that all components highlighted on license renewal boundary drawings are subject to an AMR. The staff requested that the applicant clarify if these highlighted active components are subject to an AMR. If so, the staff requested that the applicant justify their exclusion from LRA Table 2.3.3-4, or include these components in LRA Tables 2.3.3-4 and 3.3.2-4.

Applicant's Response and Staff's Evaluation

In the response dated June 10, 2004, the applicant stated that LRA Tables 2.3.3-4 and 3.3.2-4 show the passive portion of the turbo chargers as the component type "blower housing." The applicant also stated that it inadvertently highlighted the cylinder block and head, the bearings, piston cooling jets, and sump. These components are part of the alternate ac diesel generator engine assembly which, in accordance with Appendix B to NEI 95-10 and consistent with SRP-LR Table 2.1-5, are not subject to an AMR. Therefore, LRA Tables 2.3.3-4 and 3.3.2-4 do not include these components.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.3-1(b) acceptable, because the applicant appropriately included the turbo charger housings, which are passive and long-lived, within the scope of license renewal and as subject to an AMR. As such, LRA Tables 2.3.3-4 and 3.3.2-4 include them as blower housings. The applicant made an error in highlighting the active components in question on the drawings; therefore, they are not subject to an AMR. This determination is consistent with the SRP-LR and, as such, acceptable. Therefore, the staff considers its concern described in RAI 2.3.3.3-1(b) resolved, as it relates to the alternate ac generator system.

RAI 2.3.3.4-1

Section 8.3.3, "Alternate AC Power Source," of the ANO-2 UFSAR states that the engine generator set has Class F insulation, and that license renewal drawing LRA—2241, Sheet 2, shows the insulated piping as not subject to an AMR. The staff requested that the applicant briefly state the basis for excluding this insulation from within the scope of license renewal (e.g., system efficiency, heat load calculations, or EQ purposes). The insulation is passive and long-lived and should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1), if it is relied upon for EQ purposes. The staff requested that the applicant verify whether the Class F insulation is subject to an AMR.

Applicant's Response and Staff's Evaluation

In its response dated June 10, 2004, the applicant stated that the insulation referred to in UFSAR Section 8.3.3 is on the generator windings and is not piping insulation. As part of the alternate ac generator system, the generator and the piping are within the scope of license renewal. However, the generator with its associated insulation is an active component that is not subject to an AMR. The insulation shown on exhaust piping on the referenced drawing, though not specifically highlighted, is subject to an AMR.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.4-1 acceptable for the generator insulation because the insulation referred to in UFSAR Section 8.3.3 is part of the generator which is an active component and, therefore, not subject to an AMR. The staff finds the applicant's response to RAI 2.3.3.4-1 acceptable for the insulation on the exhaust piping, which is in scope and subject to an AMR with the component type "insulation." Therefore, the staff considers its concern described in RAI 2.3.3.4-1 resolved.

2.3.3.4.3 Conclusion

During its review of the information provided in the LRA, site documentation, license renewal drawings, and licensing basis information, the staff identified one omission in the applicant's scoping and screening results for insulation of the alternate ac diesel generator system. The staff determined that this error was not indicative of a flawed scoping and screening methodology. Therefore, the staff concludes that the applicant has adequately identified the alternate ac diesel generator system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the alternate ac diesel generator system components that are subject to AMR, as required by 10 CFR 54.21(a)(1).

2.3.3.5 Chemical and Volume Control

2.3.3.5.1 Summary of Technical Information in the Application

In Section 2.3.3.5 of the LRA, the applicant described the CVCS. The CVCS maintains RCS inventory and controls RCS chemistry. The CVCS system consists of four subsections, including letdown, charging, boron addition, and reactor makeup water. The CVCS also supplies borated water to the RCS from the boric acid makeup tanks or the RWT via the charging pumps.

The components in this system are mostly nonsafety related, but safety-related components include the containment isolation valves, part of the RCS pressure boundary, or boundary valves to safety-related systems. The CVCS contains nonsafety-related components, evaluated in Section 2.3.3.11 of this SER, whose failure could impact safety-related components.

This system is credited as one method of providing RCS inventory addition for safe shutdown following a fire with the suction supplied from the RWT or the boric acid makeup tanks. These components perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48).

Section 2.3.1 of this SER evaluates the portions of the CVCS that are part of the RCS pressure boundary with the RCS. Section 2.3.2.1 of this SER evaluates the CVCS valve in the supply from the RWT with the ECCS. Finally, Section 2.3.3.1 of this SER evaluates the CVCS valves in the makeup to the spent fuel pool system with the spent fuel pool system. The CVCS evaluation includes components from the nitrogen supply system that are associated with the charging pump pulsation dampeners and suction stabilizers. The CVCS is within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1–3).

In Table 2.3.3.5 of the LRA, the applicant listed the CVCS system component types that are within the scope of license renewal and subject to an AMR, including bolting, gear housing, heat exchanger (shell), piping, pump casing, sight glass, sight glass (housing), tank, thermowell, tubing, and valve.

2.3.3.5.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.5, Table 2.3.3-5, and SAR Section 9.3.4 to determine whether the applicant identified the CVCS subsystems (e.g., piping, tanks, and pump casing) and supporting structures that are within the scope of license renewal and subject to AMR, in accordance with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a). The staff used the evaluation methodology described in Section 2.3 of this SER. The staff conducted its review in accordance with the guidance described in Section 2.3 of the SRP-LR.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR, in accordance with the requirements of 10 CFR 54.4(a), to determine that the applicant did not inadvertently omit from the scope of license renewal any CVCS components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed the CVCS components that the applicant identified as within the scope of license renewal to confirm that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.3.5.3 Conclusion

During its review of the information provided in the LRA, license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scooping and screening results for the CVCS. Therefore, the staff concludes that the applicant has adequately identified the CVCS components that are within the scope

of license renewal, as required by 10 CFR 54.4(a), and the CVCS system SCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.3.6 Halon Fire Protection and Reactor Coolant Pump Motor Oil Leakage Collection

2.3.3.6.1 Summary of Technical Information in the Application

In Section 2.3.3.6 of the LRA, the applicant described the Halon fire protection system and the RCP motor oil collection system. The Halon fire protection system provides fire suppression in the core protection calculator room, flooding the room with Halon 1301 to extinguish a fire. The Halon system consists of Halon storage tanks, discharge piping, valves, controls, alarms, and smoke detectors. The RCP motor oil collection system collects random leakage from the four RCP motors to reduce the chance of a fire. Each sump tank has the capacity to contain the lube oil inventory of a single RCP.

Table 2.2-1a of the LRA lists the mechanical systems within the scope of license renewal, including the Halon fire suppression system and the RCP motor oil collection system. The applicant identified the 10 CFR 54.4(a)(3) fire protection regulated event criteria as the scoping criteria that are met by the fire protection system components which are within the scope of license renewal.

In Table 2.3.3-6 of the LRA, the applicant listed the fire protection component types that are within the scope of license renewal and subject to an AMR, including bolting, flex hose, indicator housing, nozzle, pan, piping, tank, tubing, and valve.

2.3.3.6.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.6 and ANO-2 UFSAR Sections 9.5.1.2 and 9.5.1.3. The staff conducted its review, using the evaluation methodology described in Section 2.3 of this SER, in accordance with the guidance described in Section 2.3 of the SRP-LR.

In the performance of the review, the staff, using the scoping process described in Section 2.3 of this SER, reviewed the UFSAR to determine if the applicant failed to identify in the LRA any system functions, in accordance with the requirements of 10 CFR 54.4(a), as an intended function of the fire protection system. The staff then reviewed the LRA and UFSAR, in accordance with the screening process described in Section 2.3 of this SER, to confirm that the applicant did not omit any passive and long-lived components that are subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

The staff found that the applicant identified those portions of the Halon fire protection system and RCP motor oil collection system that meet the scoping requirements of 10 CFR 54.4 as within the scope of license renewal and included them in LRA Section 2.3.3.6. The applicant included the Halon fire protection system components and RCP motor oil collection system components that are subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), in LRA Table 2.3.3-6. The staff did not identify any omissions.

2.3.3.6.3 Conclusion

The staff reviewed the LRA and the accompanying scoping boundary drawings to determine whether the applicant failed to identify any SSCs that should be within the scope of license renewal. The staff did not identify any omissions. In addition, the staff performed an independent assessment to determine whether the applicant failed to identify any components that should be subject to an AMR. The staff did not identify any omissions. On the basis of its review, the staff concludes that the applicant has adequately identified the components of the fire protection system that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the components of the fire protection system that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.3.7 Fuel Oil

2.3.3.7.1 Summary of Technical Information in the Application

In Section 2.3.3.7 of the LRA, the applicant described the fuel oil system. The fuel oil system provides fuel oil for site components, including the various diesel engines and the auxiliary boiler. The system consists of various tanks, pumps, injectors, piping, and valves to store and transfer fuel oil.

The system contains components that are the safety-related source of diesel fuel as required for emergency diesel operation during design-basis events. The system provides diesel fuel as required to the alternate ac generator for the SBO event. The fuel oil to the fire diesel, the emergency generators, and alternate ac generators is credited for the safe-shutdown fire regulated event.

The fuel oil system includes ANO-1 shared components, such as the bulk fuel oil storage tank. To have a complete review of components required for ANO-2 operation, components necessary for providing fuel oil to the systems required for ANO-2 are evaluated even if they have already been reviewed for ANO-1 license renewal. The ANO-1 fuel oil system is credited as a backup supply to the ANO-2 diesel generators in the case of a fire that renders the ANO-2 fuel oil transfer pumps unavailable.

The fuel oil system includes safety-related components and is therefore within the scope of license renewal, based on 10 CFR 54.4(a)(1). The fuel oil system is required for compliance with the Commission's regulations for fire protection (10 CFR 50.48) and SBO events. Therefore, it is within the scope of license renewal based on 10 CFR 54.4(a)(3).

In Table 2.3.3.7 of the LRA, the applicant listed the compressed air component types that are within the scope of license renewal and subject to an AMR, including bolting, filter, filter housing, flame arrestor, flex hose, heat exchanger (shell), heat exchanger (tubes), indicator housing, injector housing, orifice, piping, pump casing, tank, thermowell, tubing, and valve.

2.3.3.7.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.7, ANO-2 UFSAR Sections 8.3.3.2.3.3, 9.5.1, and 9.5.4, and site documentation in its scoping and screening review of fuel oil system. The staff conducted its review, with the support from the plant audit and applicant's methodology

described in Section 2.3 of this SER, in accordance with the guidance described in Section 2.3 of the SRP-LR.

In the performance of its review, the staff selected system functions described in the UFSAR, in accordance with the requirements of 10 CFR 54.4, and evaluated site documentation to confirm that the applicant did not inadvertently omit from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). In LRA Section 2.3.3.11, the applicant separately compiled scoping and screening results for all components with intended functions that are within the scope of license renewal, per 10 CFR 54.4(a)(2). The staff reviews those components for the fuel oil system in Section 2.3.3.11 of this SER. The staff then reviewed those components that the applicant identified as having an intended function to confirm that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

On the basis of its review, the staff found that the applicant has identified those portions of the fuel oil system that meet the scoping requirements of 10 CFR 54.4 and included them within the scope of license renewal in LRA Section 2.3.3.7. The applicant has also included the fuel oil system components that are subject to an AMR, in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), in LRA Table 2.3.3-7. The staff did not identify any omissions.

2.3.3.7.3 Conclusion

During its review of the information provided in the LRA, site documentation, license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the components of the fuel oil system. Therefore, the staff concludes that the applicant has adequately identified the fuel oil system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the fuel oil system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.3.8 Service Water

2.3.3.8.1 Summary of Technical Information in the Application

In Section 2.3.3.8 of the LRA, the applicant described the service water system. The service water system provides cooling water from Lake Dardanelle or the emergency cooling pond to safety-related and nonsafety-related equipment, as well as an emergency supply of water to the emergency feedwater system and the fuel pool system. The service water system provides cooling water to two independent flowpaths, which furnish water to two independent, safety-related engineered safety features equipment trains and two nonsafety-related flowpaths (auxiliary cooling water and component cooling water heat exchangers/main chillers). Three service water pumps supply the various components cooled by service water.

The service water system is the safety-related source of cooling water for equipment cooling during design-basis events. The system contains nonsafety-related components, evaluated in Section 2.3.3.11 of this SER, whose failure could impact safety-related components. The service water system is required to function following a fire for safe shutdown of the unit.

The emergency feedwater suction supply valves from the service water system are evaluated with the service water system. The service water evaluation also includes hydrogen control system valves that were originally intended to supply service water under accident conditions to the purge components but now only have the safety function of maintaining the service water pressure boundary. Ventilation components that provide cooling for the service water pumps and motors are classified as part of the intake structure system but are evaluated with the service water system. The individual service water supplied heat exchangers are evaluated with the systems that they cool.

The service water system is within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1)-(3).

In Table 2.3.3-8 of the LRA, the applicant listed the service water component types that are within the scope of license renewal and subject to an AMR, including blower housing, bolting, damper housing, ductwork, expansion joint, filter, filter housing, flow straightener, orifice, piping, pump casing, thermowell, tubing, and valve.

2.3.3.8.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.8, ANO-2 UFSAR Sections 9.2.1, 9.2.5, 3.6.4.5.1.1, and 9.4.6, and site documentation in its scoping and screening review of the service water system. The staff conducted its review, with the support from the plant audit and applicant's methodology described in Section 2.3 of this SER, in accordance with the guidance described in Section 2.3 of the SRP-LR.

In the performance of its review, the staff selected system functions described in the UFSAR, in accordance with the requirements of 10 CFR 54.4, and evaluated site documents to confirm that the applicant did not inadvertently omit from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). In LRA Section 2.3.3.11, the applicant separately compiled scoping and screening results for all components with intended functions that are within the scope of license renewal, per 10 CFR 54.4(a)(2). The staff reviews those components for the service water system in Section 2.3.3.11 of this SER. The staff then reviewed those components that the applicant identified as having an intended function to confirm that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

On the basis of its review, the staff found that the applicant has identified those portions of the service water system that meet the scoping requirements of 10 CFR 54.4(a) and included them within the scope of license renewal in LRA Section 2.3.3.8. The applicant also included the service water system components that are subject to an AMR, in accordance with 10 CFR 54.21(a)(1), in LRA Table 2.3.3-8. The staff did not identify any omissions.

2.3.3.8.3 Conclusion

During its review of the information provided in the LRA, site documentation, license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the components of the spent fuel pool system. Therefore, the staff concludes that the applicant has adequately identified the service water system components that are within the scope of license renewal, as required by

10 CFR 54.4(a), and the service water system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.3.9 Auxiliary Building Ventilation

2.3.3.9.1 Summary of Technical Information in the Application

In Section 2.3.3.9 of the LRA, the applicant described the auxiliary building ventilation. The auxiliary building ventilation system provides ventilation for equipment in the auxiliary building and the auxiliary building extension. The system consists of safety-related and nonsafety-related equipment in the auxiliary building to provide both normal and emergency cooling and ventilation. The system includes the auxiliary building heating and ventilation system code.

The auxiliary building is served by separate ventilation systems for each of the following areas:

- fuel handling floor radwaste area
- auxiliary building radwaste area (includes electrical equipment room 2096)
- noncontaminated areas
- emergency diesel generator rooms
- battery rooms and direct current equipment rooms
- switchgear rooms
- cable spreading room and electrical equipment room 2108
- computer room 2098-C
- electrical MG room 2076
- ventilation equipment room
- main steamline enclosure
- elevator-machine room
- boiler room area
- heat exchanger and pipeway area
- electrical equipment room 2091

The components within these subsystems include supply and exhaust fans, cooling and heating coils, dampers, filters, ductwork, condensing units, and dehumidifiers.

Safety-related ventilation systems serve areas containing safety-related equipment, including the HPSI pumps, the charging pumps, the shutdown cooling heat exchangers, the emergency feedwater pumps, electrical equipment (rooms 2091 and 2096), the EDGs, batteries, and switchgear.

This system contains nonsafety-related components, evaluated in Section 2.3.3.11, whose failure could impact safety-related components. The cooling for some components, such as the EDG room and the safety parameters display system room, is required to support safe shutdown following a fire. The fire dampers included in this system are required for fire protection (10 CFR 50.48).

Section 2.3.3.10 of this SER evaluates components in the auxiliary building heating and ventilation system code that support control room ventilation with control room ventilation. The system is within the scope of license renewal based on 10 CFR 54.4(a)(1)-(3).

In Table 2.3.3-9 of the LRA, the applicant listed the auxiliary ventilation system component types that are within the scope of license renewal and subject to an AMR, including blower housing, bolting, cooling coil housing, damper housing, ductwork, expansion joint, heat exchanger (tubes), piping, tubing, and valve.

2.3.3.9.2 Staff Evaluation

The staff reviewed LRA Sections 2.1.1, 2.3.3.9, and 2.3.3.11 and ANO-2 UFSAR Section 9.4.2 using the evaluation methodology described in Section 2.1 of this SER. The staff conducted its review in accordance with the guidance described in Section 2.3 of the SRP-LR.

In conducting the review, the staff evaluated the system functions described in the LRA and UFSAR, in accordance with the requirements of 10 CFR 54.4(a), to confirm that the applicant did not inadvertently omit from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4 (a). The staff then reviewed those that the applicant identified as within the scope of license renewal to confirm that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Sections 2.1.1, 2.3.3.9, and 2.3.3.11, the staff identified an area in which it needed additional information to complete the review of the applicant's scoping and screening results. Therefore, by letter dated April 8, 2004, the staff issued RAIs, described below, concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1).

RAI 2.3-1b

The staff requested that the applicant determine that the LRA has not omitted any auxiliary building ventilation system SCs that should be within the scope of license renewal, according to 10 CFR 54.4(a).

Applicant's Response and Staff's Evaluation

In its response, dated May 19, 2004, the applicant stated that, in accordance with 10 CFR 54.21(a)(1), auxiliary building ventilation system SCs subject to AMR are those that perform an intended function without moving parts or a change in configuration or properties (i.e., passive) and that are not subject to replacement based on a qualified life or specified time period (i.e., long-lived). Among the systems and structures within the scope of license renewal, the applicant identified the auxiliary building ventilation system SCs that are subject to an AMR, in accordance with 10 CFR 54.21, in LRA Tables 2.2-1a, 2.2-1b, and 2.2-3. The applicant conservatively considered them to be within the scope of license renewal for the purpose of identifying SCs that are subject to an AMR.

Based on its review, the staff finds the applicant's response to RAI 2.3-1b acceptable, because the applicant considered all components within the auxiliary building ventilation system as identified in LRA Tables 2.2-1a and 2.2-1b, and all auxiliary building ventilation system structures identified in LRA Table 2.2-3, to be within the scope of license renewal for the purpose of identifying SCs that are subject to AMR. Therefore, the staff's concern described in RAI 2.3-1b is resolved.

RAI 2.3-2

In LRA Section 2.1.1, the applicant stated that it prepared LRA drawings (for the auxiliary building ventilation system) to indicate components subject to an AMR. The applicant did not indicate components (for the auxiliary building ventilation system) that are subject to an AMR based only on the criteria of 10 CFR 54.4(a)(2) on the LRA drawings (for the auxiliary building ventilation system). The staff requested that the applicant determine that the LRA has not omitted any auxiliary building ventilation system SCs that should be within the scope of license renewal, according to 10 CFR 54.4(a).

Applicant's Response and Staff's Evaluation

In its response, dated May 19, 2004, the applicant stated that, in accordance with 10 CFR 54.21(a)(1), as given in the response to RAI 2.1.1-2, it considered all components (for the auxiliary building ventilation system) within the systems identified in LRA Tables 2.2-1a and 2.2-1b, and all structures (for the auxiliary building ventilation system) identified in LRA Table 2.2-3, to be within the scope of license renewal for the purpose of identifying SCs (for the auxiliary building ventilation system) that are subject to AMR, including components in the system considered only in response to 10 CFR 54.4(a)(2).

Based on its review, the staff finds the applicant's response to RAI 2.3-2 acceptable, because the applicant considered all components within the auxiliary building ventilation system as identified in LRA Tables 2.2-1a and 2.2-1b, and all auxiliary building ventilation system structures identified in LRA Table 2.2-3, to be within the scope of license renewal for the purpose of identifying SCs that are subject to AMR. Therefore, the staff's concern described in RAI 2.3-2 is resolved.

RAI 2.3-3.b

The staff requested that the applicant clarify whether sealants used as a pressure boundary function for the auxiliary building ventilation system are within the scope of license renewal, in accordance with 10 CFR 54.4(a), and subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

Applicant's Response and Staff's Evaluation

In its response, dated May 19, 2004, the applicant stated that it did not credit sealants with a function of pressure boundary for the auxiliary building ventilation system. Sealants used in the auxiliary building ventilation system do not perform a license renewal intended function.

Based on its review, the staff finds the applicant's response to RAI 2.3-3.b acceptable, because the applicant did not credit sealants to perform any pressure boundary function for the auxiliary building ventilation system and, as such, sealants do not perform a license renewal intended function. Therefore, the staff's concern described in RAI 2.3-3.b is resolved.

2.3.3.9.3 Conclusion

During its review of information provided in the LRA, license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the SCs of the auxiliary building ventilation system. Therefore, the staff concludes that the applicant has adequately identified the auxiliary building ventilation system SCs that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the auxiliary building ventilation system SCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.3.10 Control Room Ventilation

2.3.3.10.1 Summary of Technical Information in the Application

In Section 2.3.3.10 of the LRA, the applicant described the control room ventilation system, which provides a suitable environment for equipment and personnel in the control room. The system contains normal and emergency operation trains that include ductwork, filter units, blowers, cooling units, and heat exchangers to supply the control room space with the proper heating or cooling and limit the postaccident dose rate to the operators.

The control room ventilation system is the safety-related source of ventilation required for control room cooling during design-basis events. It provides protection from emergency events, such as a toxic gas release. The system contains fire dampers that must close to isolate the control room in the event of a fire. These dampers are required for compliance with the Commission's regulations for fire protection (10 CFR 50.48).

This system is shared with ANO-1. To have a complete review of the components required for ANO-2 operation, the components necessary for providing cooling for ANO-2 are evaluated even if they have already been reviewed for ANO-1 license renewal. This evaluation includes the safety-related components of the chilled water system that support control room ventilation. The control room ventilation system is within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1) and 10 CFR 54.4(a)(3).

In Table 2.3.3.10 of the LRA, the applicant listed the auxiliary and radwaste area ventilation system component types that are within the scope of license renewal and subject to an AMR, including blower housing, bolting, compressor casing, cooling coil housing, damper housing, ductwork, expansion joint, filter housing, heat exchanger (bonnet), heat exchanger (shell), heat exchanger (tubes), indicator housing, piping, sight glass, sight glass (housing), silencer, tank, thermowell, tubing, and valve.

2.3.3.10.2 Staff Evaluation

The staff reviewed LRA Sections 2.1.1 and 2.3.3.10 and ANO-2 UFSAR Section 9.4.2 using the evaluation methodology described in Section 2.1 of this SER. The staff conducted its review in accordance with the guidance described in Section 2.3 of the SRP-LR.

In conducting the review, the staff evaluated the system functions described in the LRA and UFSAR, in accordance with the requirements of 10 CFR 54.4(a), to confirm that the applicant did not inadvertently omit from the scope of license renewal any components with intended

functions delineated under 10 CFR 54.4(a). The staff then reviewed those that the applicant identified as within the scope of license renewal to confirm that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Sections 2.1.1 and 2.3.3.10, the staff identified an area in which it needed additional information to complete its evaluation of the applicant's scoping and screening results. Therefore, by letter dated April 8, 2004, the staff issued RAIs, described below, concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1).

RAI 2.3-1c

The staff requested that the applicant determine that the LRA has not omitted any control room ventilation system SCs that should be within the scope of license renewal, according to 10 CFR 54.4(a).

Applicant's Response and Staff's Evaluation

In its response, dated May 19, 2004, the applicant stated that, in accordance with 10 CFR 54.21(a)(1), control room ventilation system SCs subject to AMR are those that perform an intended function without moving parts or a change in configuration or properties (i.e., passive) and that are not subject to replacement based on a qualified life or specified time period (i.e., long-lived). Among the systems and structures within the scope of license renewal, the applicant identified control room ventilation system SCs that are subject to an AMR, in accordance with 10 CFR 54.21, in LRA Tables 2.2-1a, 2.2-1b, and 2.2-3. The applicant conservatively considered them to be within the scope of license renewal for the purpose of identifying SCs that are subject to an AMR.

Based on its review, the staff finds the applicant's response to RAI 2.3-1c acceptable, because the applicant considered all components within the control room ventilation system as identified in LRA Tables 2.2-1a and 2.2-1b, and all control room ventilation system structures identified in LRA Table 2.2-3, to be within the scope of license renewal for the purpose of identifying SCs that are subject to an AMR. Therefore, the staff's concern described in RAI 2.3-1c is resolved.

RAI 2.3-2

In Section 2.1.1 of the LRA, the applicant stated that it prepared LRA drawings (for the control room ventilation system) to indicate components subject to an AMR. The LRA drawings (for the control room ventilation system) do not indicate the components (for the control room ventilation system) that are subject to an AMR based only on the criteria of 10 CFR 54.4(a)(2). The staff requested that the applicant determine that the LRA has not omitted any control room ventilation system SCs that should be within the scope of license renewal, according to 10 CFR 54.4(a).

Applicant's Response and Staff's Evaluation

In its response, dated May 19, 2004, the applicant stated that, in accordance with 10 CFR 54.21(a)(1), as noted in the response to RAI 2.3-2, the applicant considered all

components (for the control room ventilation system) within the systems identified in LRA Tables 2.2-1a and 2.2-1b, and all structures (for the control room ventilation system) identified in LRA Table 2.2-3, to be within the scope of license renewal for the purpose of identifying SCs (for the control room ventilation system) that are subject to AMR, including components in the system considered only for 10 CFR 54.4(a)(2).

Based on its review, the staff finds the applicant's response to RAI 2.3-2 acceptable, because the applicant considered all components within the control room ventilation system as identified in LRA Tables 2.2-1a and 2.2-1b, and all control room ventilation system structures identified in LRA Table 2.2-3, to be within the scope of license renewal for the purpose of identifying SCs that are subject to AMR. Therefore, the staff's concern described in RAI 2.3-2 is resolved.

RAI 2.3-3(a)

The staff requested that the applicant clarify whether it included the sealants used on the main control room envelope to prevent unfiltered inleakages within the scope of license renewal, in accordance with 10 CFR 54.4(a), and subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

Applicant's Response and Staff's Evaluation

In its response, dated May 19, 2004, the applicant stated that it included sealants or elastomers that are used on the main control room envelope within the scope of license renewal. These sealants are structural sealants used to minimize leakage into the control room. They are addressed as part of structural bulk commodities and are subject to an AMR, as documented in Section 2.4 of the LRA. Table 2.4-4 of the LRA lists the sealants under the component type "elastomers."

Based on its review, the staff finds the applicant's response to RAI 2.3-3.a acceptable, because the applicant considered sealants and elastomers within the control room ventilation system, as identified in LRA Table 2.4-4, to be within the scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.2.3-3(a) is resolved.

2.3.3.10.3 Conclusion

During its review of information provided in the LRA, license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the SCs of the control room ventilation system. Therefore, the staff concludes that the applicant has adequately identified the control room ventilation system SCs that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the control room ventilation system SCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.3.11 Miscellaneous Systems in Scope for 10 CFR 54.4(a)(2)

2.3.3.11.1 Summary of Technical Information in the Application

In Section 2.3.3.11 of the LRA, the applicant described the miscellaneous systems within the scope of license renewal for 10 CFR 54.4(a)(2). The applicant identified the systems within the

scope of license renewal based on the criteria of 10 CFR 54.4(a)(2) using the method described in Section 2.1.1.2 of this SER. The applicant reviewed each mechanical system to identify nonsafety-related systems or nonsafety-related portions of safety-related systems with the potential for adverse spatial interaction with safety-related systems or components. This section evaluates components subject to an AMR because of the scoping criteria of 10 CFR 54.4(a)(2). Systems within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(2) may also meet the criteria of 10 CFR 54.4(a)(1). The system description discusses which scoping criteria are met.

The following systems, described in the referenced sections of this SER, are within the scope of license renewal based on the criteria of 10CFR54.4(a)(2):

- auxiliary building ventilation (Section 2.3.3.9)
- containment spray (Section 2.3.2.2)
- chemical and volume control (Section 2.3.3.5)
- containment cooling (reactor building ventilation) (Section 2.3.2.3)
- emergency feedwater and condensate storage and transfer (Section 2.3.4.3)
- spent fuel pool (fuel pool cooling and purification) (Section 2.3.3.1)
- main feedwater (Section 2.3.4.2)
- emergency core cooling (LPSI) (Section 2.3.2.1)
- main steam (Section 2.3.4.1)
- reactor coolant (RCS and RCP system) (Section 2.3.1)
- service water (Section 2.3.3.8)
- water suppression fire protection (Section 2.3.3.2)

The following systems are within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(2) and have not been described elsewhere in the application:

- auxiliary building sump
- postaccident sampling system
- auxiliary cooling water
- plant heating
- auxiliary steam
- primary sampling
- boron management
- regenerative waste
- chemical addition
- resin transfer
- chilled water
- sampling system
- circulating water
- shutdown cooling
- component cooling water
- spent resin
- domestic water
- startup and blowdown demineralizers
- drain collection header
- steam generator secondary/blowdown
- liquid radwaste management

- turbine building sump

The descriptions below note those cases where additional scoping criteria apply and reference the section of this SER evaluating the affected components.

Auxiliary Building Sump. The auxiliary building sump system provides drainage for equipment to support normal plant operation. The system contains piping, valves, and pumps for equipment and floor drains in the containment, auxiliary building, and turbine building.

Section 2.3.2.4 of this SER evaluates the safety-related components at the containment penetration with the containment penetrations. Therefore, the auxiliary building sump system is also within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1).

Auxiliary Cooling Water. The auxiliary cooling water system provides cooling water to nonsafety-related components in the auxiliary building and turbine building to support normal plant operation. The service water system pumps supply water to the auxiliary cooling water system. Service water system valves provide isolation of the service water system from auxiliary cooling water as necessary under accident conditions.

Auxiliary Steam. The auxiliary steam system provides low-pressure steam for heating and process purposes to support normal plant operation and system testing. The system contains valves, orifices, piping, and tubing.

Boron Management. The boron management system provides collection, handling, and treatment of borated water to assist in the control of the boron concentration of the primary systems. The major influent to the boron management system is reactor coolant from the CVCS letdown as a result of feed and bleed operations for shutdown, startup, and boron dilution over core life. The boron management system consists of boric acid tanks, holdup tanks, pumps, and various piping and valves. The system also contains boric acid evaporators and concentrators, but these are no longer used.

The system contains safety-related components and is therefore also within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1). Section 2.3.2.4 of this SER evaluates these safety-related components with the containment penetration system.

Chemical Addition. The chemical addition system provides chemicals for various water systems. The majority of this system is not safety related and only supports proper water chemistry controls for normal plant operation. The system includes chemical storage tanks, pumps, valves, and miscellaneous components needed to store and inject chemicals. The system includes the safety-related trisodium phosphate dodecahydrate (TSP-C) baskets in the containment and is therefore also within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1). Section 2.4.4 of this SER evaluates the TSP-C baskets in the containment as a structural bulk commodity.

Chilled Water. The chilled water system provides chilled water to cooling units. This system includes components of several closed-loop chilled water systems in different areas of the plant, such as the containment, auxiliary building, and turbine building. Many of the system components are nonsafety related, are not required for emergency cooling or regulated events, and only provide cooling to support normal plant operation.

The system contains safety-related components and is therefore also within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1). Section 2.3.2.4 of this SER evaluates the containment penetration components, and Section 2.3.3.10 of this SER evaluates the components in control room ventilation.

Circulating Water. The circulating water system provides cooling water to the main condenser. One section of pipe and a valve require an AMR, based on the criteria of 10 CFR 54.4(a)(2). These components, located in the auxiliary building, drain the circulating water system to the service water discharge pipe.

Component Cooling Water. The component cooling water system provides closed-cycle cooling water to nonsafety-related components to support normal plant operation. The system consists of tanks, pumps, and associated valves and piping to the nonsafety-related equipment.

The system contains safety-related components and is therefore also within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1). Section 2.3.2.4 of this SER evaluates these safety-related components with the containment penetrations system.

Domestic Water. The domestic water system provides makeup water to plant systems and supplies water for domestic use (e.g., drinking water and sinks). The domestic water system consists of tanks, pumps, and the associated piping and valves.

Drain Collection Header. The drain collection header system provides a drain flowpath for numerous components in the auxiliary building. The system consists of piping and valves.

Liquid Radwaste Management. The liquid radwaste management system collects and processes the liquid radioactive wastewater. The system includes pumps, piping, valves, and tanks that collect, transport, and store the liquids.

Plant Heating. The plant heating system provides hot water for plant heating. It includes a boiler, pumps, piping, valves, and area heaters.

This system includes safety-related components at the containment penetration and is therefore also within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1). Section 2.3.2.4 of this SER evaluates these components with the containment penetrations system. The system contains a valve that is required for the fuel oil pressure boundary to the fire diesel and is therefore also within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(3). The fuel oil system evaluation in Section 2.3.3.7 of this SER includes this valve.

Postaccident Sampling System. The postaccident sampling system provides postaccident sampling of the containment. The system includes piping, valves, coolers, pumps, sample containers, and detectors to allow the samples to be drawn and analyzed.

Primary Sampling. The primary sampling system collects and analyzes samples from the RCS and associated auxiliary systems. The system contains heat exchangers, pumps, tanks, valves, piping, and other mechanical components. The sampling function is not a safety function.

The primary sampling system contains safety-related components and is therefore also within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1). Section 2.3.1 of this SER evaluates the components in this system that are part of the RCS pressure boundary. Section 2.3.2.1 evaluates the components in this system that are part of the ECCS pressure boundary. Section 2.3.2.4 evaluates the containment penetration components.

Regenerative Waste. The regenerative waste system processes and regenerates radioactive wastewater. This system was originally designed with radioactive waste evaporators that are no longer used. The system contains pumps, tanks, filters, valves, piping, and other miscellaneous mechanical components.

Resin Transfer. The resin transfer system transfers resin for the various site demineralizers. The system includes valves and piping.

Sampling System. The sampling system collects samples from plant systems to ensure proper chemistry control. The sampling system consists of pumps, heat exchangers, filters, valves, tanks, piping, and other miscellaneous components.

The system includes safety-related piping and valves at containment penetrations that have the safety function of maintaining the steam generator secondary pressure boundary and containment integrity under accident conditions. The system is therefore also within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1). The steam generator secondary-side pressure boundary, as maintained by these components, is required during a safe shutdown following a fire. The system is therefore also within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(3). Section 2.3.2.4 of this SER evaluates these components with the containment penetrations system.

Shutdown Cooling. The shutdown cooling system provides cooling of the RCS without reliance on the steam generators. The shutdown cooling system consists of heat exchangers, valves, tanks, piping, and other miscellaneous components.

Certain shutdown cooling components are also used for postaccident operation as part of the LPSI system. The system is therefore also within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1). The system contains components that are required for safe shutdown following a fire and is therefore also within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(3). Section 2.3.2.1 of this SER evaluates these components with the ECCS.

Spent Resin. The spent resin system facilitates the transfer and storage of resin from the site demineralizers before its disposal. The system consists of tanks, pumps, filters, valves, piping, and other miscellaneous mechanical components.

Startup and Blowdown Demineralizers. The startup and blowdown demineralizer system removes impurities from condensate and steam generator water inventory. The blowdown demineralizer system starts at the blowdown lines at the steam generators and includes the blowdown heat exchangers tank, the blowdown demineralizers, blowdown pumps, and the associated piping and valves. The majority of the system components outside of containment are not safety related.

The components in containment are safety related to provide a closed loop inside the containment building for containment integrity. The system is therefore also within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1). The system must isolate to control the steam generator inventory under accident conditions and during safe shutdown following a fire when the steam generators are fed by emergency feedwater. The system is therefore also within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(3). Section 2.3.2.4 of this SER evaluates these components with the containment penetrations.

Steam Generator Secondary/Blowdown. The steam generator secondary/blowdown system includes instrumentation valves, tubing, and piping on the steam generator secondary side, as well as components in the steam generator blowdown subsystem. The instrumentation piping and valves sense the steam generator secondary side conditions and provide a main steam system pressure boundary. The steam generator instrumentation maintains pressure boundary integrity and indicates steam generator secondary-side conditions during safe shutdown following a fire.

The steam generator secondary/blowdown system contains safety-related components and is therefore also within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1). The system contains components that are required for safe shutdown following a fire and is therefore also within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(3). Sections 2.3.4.1 and 2.3.4.2 of the SER include these components in the evaluations for main steam and main feedwater, respectively.

Turbine Building Sump. The turbine building sump system provides the floor drains for components in the turbine building and other areas, such as the emergency feedwater and EDG rooms. The system consists of pumps, filters, valves, piping, and other miscellaneous mechanical components.

In Table 2.3.3-11 of the LRA, the applicant listed the miscellaneous system component types that are within the scope of license renewal and subject to an AMR, including bolting, filter housing, heat exchanger (shell, channel head), heat exchanger (heating or cooling coil when not enclosed in a housing), level glass gauge, orifice, piping, pump casing, tank, thermowell, tubing, valve, and ventilation unit housing.

2.3.3.11.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.11, the ANO-2 UFSAR, and Engineering Report A2-ME-2003-001-0, Revision 1. The staff conducted its review, with support from the plant audit and the applicant's methodology described in Section 2.3 of this SER, in accordance with the guidance described in Section 2.3 of the SRP-LR.

In the performance of its review, the staff selected the miscellaneous system functions described in the UFSAR, in accordance with the requirements of 10 CFR 54.4, and evaluated the cited engineering report to confirm that the applicant did not inadvertently omit from the scope of license renewal any components of the miscellaneous systems with intended functions delineated under 10 CFR 54.4(a)(2). The staff then reviewed the applicant's screening process, with the information in the LRA, the engineering report, and the screening methodology described in Section 2.3 of this SER, to confirm that the applicant did not omit any

passive and long-lived components of the miscellaneous systems that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.11 and the engineering report, the staff identified areas in which it needed additional information to complete its evaluation of the applicant's scoping and screening results. Therefore, by letter dated May 11, 2004, the staff issued RAIs, described below, to the applicant concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1).

RAI 2.3.3.11-1(a)

The staff reviewed Engineering Report A2-ME-2003-001-0, Revision 1, Section 3.62, "Plant Heating," and Section 3.87, "Turbine Building Sump," and noted that both sections list cast iron components (i.e., valves and piping) as requiring an AMR. However, LRA Table 3.3.2-11 does not contain an entry for cast iron valve bodies or piping for the environments cited in the engineering report. Therefore, the staff requested that the applicant explain why a separate entry in LRA Table 3.3.2-11 does not exist for cast iron components, or update LRA Table 3.3.2-11 to include them.

Applicant's Response and Staff's Evaluation

In its response dated June 10, 2004, the applicant stated that cast iron material type is included in the general material type "carbon steel" since the aging effect (loss of material) and AMPs (System Walkdown Program for all components and Water Chemistry Control Program for treated water systems) are the same for carbon steel or cast iron components in Engineering Report A2-ME-2003-001-0, Revision 0. The engineering report indicates this inclusion of cast iron in the carbon steel material type with the phrase "carbon steel (including cast iron)" or "carbon steel (cast iron)" in Sections 3.62 and 3.87. These subsections of the engineering report identify selective leaching as an aging mechanism that will result in the aging effect of loss of material for cast iron components.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.11-1(a) acceptable, because the aging effects for cast iron are similar to those of carbon steel in the same environments. An evaluation performed by an NRC staff metallurgist supports this statement. Therefore, the staff considers its concern described in RAI 2.3.3.11-1(a) resolved.

RAI 2.3.3.11-1(b)

Section 2.3.3.11 of the LRA lists the component types "tank" and "filters" for the regenerative waste system. The staff reviewed Section 3.75 of Engineering Report A2-ME-2003-001-0 and found that the list of the passive mechanical components in the regenerative waste system that require an AMR to meet the criteria of 10 CFR 54.4(a)(2) does not include tanks or filters. Therefore, the staff requested that the applicant justify why these tanks and filters are not subject to an AMR, when the piping and valves leading to them are subject to an AMR.

Applicant's Response and Staff's Evaluation

In its response dated June 10, 2004, the applicant stated that, as identified in Engineering Report A2-ME-2003-001-0, a large portion of the regenerative waste system is not used. This system was originally designed with radioactive waste evaporators and other associated components that are no longer used.

The applicant further stated that no tanks in the system are within the scope of license renewal, per 10 CFR 54.4(a)(2), since the tanks that are in the system are empty or are located in areas that cannot affect safety-related components. Two filters, as well as the piping and valves, associated with the regenerative waste system are located in the auxiliary building and are subject to an AMR. Section 3.75 of A2-ME-2003-001-0 does not specifically identify these two filters, but Attachment 2 of A2-ME-2003-001-0 includes them. Tables 2.3.3-11 and 3.3.2-11 of the LRA include them as component type "filter housing."

Based on its review, the staff finds the applicant's response to RAI 2.3.3.11-1(b) acceptable, because the filter housings are appropriately included within the scope of license renewal and are subject to an AMR. With regard to the tanks, the applicant has verified that the tanks of concern currently do not contain liquid or will not spatially interact with safety-related components. As such, these tanks do not meet the criteria in 10 CFR 54.4(a)(2) and are not within the scope of license renewal. Therefore, the staff considers its concern described in RAI 2.3.3.11-1(b) resolved.

RAI 2.3.3.11-1(c))

Pursuant to 10 CFR 54.21(a), applicants must identify and list in their LRAs those SCs that are subject to an AMR. The staff identified that the LRA does not satisfy this requirement because the applicant did not identify the mechanical components within the scope of license renewal, in accordance with 10 CFR 54.4(a)(2), as subject to an AMR on license renewal drawings or, by any designator or specific description, in Engineering Report A2-ME-2003-001-0. The engineering report provides a general description on aging management of nonsafety-related systems and components affecting safety-related systems but does not specify or identify the components that require an AMR for each system. Therefore, the staff requested that the applicant provide a means of specifically identifying mechanical components subject to an AMR.

Applicant's Response and Staff's Evaluation

In its response dated June 10, 2004, the applicant stated that it considered the impacts of the failure of nonsafety-related SSCs to be either functional or spatial. In a functional failure, the failure of an SSC to perform its normal function impacts another safety function. In a spatial failure, a safety function is impacted by the loss of structural or mechanical integrity of an SSC in physical proximity to a safety-related component. Spatial failures result in the inclusion of the most equipment. Section 2.1.1.2.2 of the LRA provides information on how and where nonsafety-related equipment can impact safety-related equipment through spatial interaction. The applicant also stated that, in Engineering Report A2-ME-2003-0001-0, it reviewed all mechanical systems at ANO-2. If a system contains components subject to an AMR in accordance with the requirements of 10 CFR 54.4(a)(2), then the applicant listed the component types subject to an AMR in the system section of the LRA. The applicant further

stated that highlighted license renewal drawings identifying 10 CFR 54.4(a)(2) components would be of limited value to a reviewer since license renewal drawings do not provide equipment location information. Without location information, it cannot be determined if nonsafety-related equipment has a potential for spatial interaction, such as that from leakage or spray, with safety-related equipment.

The applicant then described the approach implemented in Engineering Report A2-ME-2003-0001-0 to identify mechanical systems that meet the requirements of 10 CFR 54.4(a)(2) and components that are subject to an AMR for leakage and spray. First, the applicant identified the structures at ANO-2 containing safety-related equipment. The applicant identified the ANO-2 containment building, auxiliary building, intake structures, and emergency diesel fuel oil storage vault as the primary seismic Class 1 structures at ANO-2 containing safety-related plant equipment. These areas contain the relevant targets (i.e., safety-related SSCs with the potential to be affected by failure of nonsafety-related components). Second, if the system contains liquid or steam and has nonsafety-related equipment in the containment building, auxiliary building, intake structures, or emergency diesel fuel oil storage vault, then the applicant reviewed individual system components. The applicant performed this review with the ANO-2 component database information that identifies component locations. The applicant reviewed liquid- or steam-filled nonsafety-related components in the safety-related structures specified above for their potential for interaction with safety-related equipment using equipment location information in the ANO-2 component database and equipment layout drawings. Initially, the applicant included all nonsafety-related components containing liquid or steam located in the containment building, auxiliary building, intake structure, and emergency diesel fuel storage vault as subject to an AMR unless no safety-related equipment is in the area of the nonsafety-related component. The applicant performed additional reviews to exclude specific nonsafety-related components where design features, such as room separation, walls, panels, or enclosures, would protect safety-related equipment from leakage or spray. The applicant stated that it identified nonsafety-related components within the scope of license renewal and subject to an AMR, in accordance with the requirements of 10 CFR 54.4(a)(2), to the extent necessary to assure effective management of the effects of aging.

However, the staff found that the applicant's response did not specifically identify which components in the nonsafety-related systems meet the 10 CFR 54.4(a)(2) scoping criteria and are subject to an AMR. In a followup question, the staff asked the applicant to identify the nonsafety-related components having either functional or spatial impacts on safety-related components and subject to an AMR using one of the following previously accepted methods or another equally effective method. The applicant should (1) list specific systems and specific identifiable plant areas where all components of the listed system are within the scope of license renewal, (2) list specific components subject to an AMR, or (3) identify components within the scope of license renewal by highlighting them on system drawings.

Specifically, the staff requested, for certain systems with the credible potential to cause broad spatial effects through flooding (i.e., large-diameter fire water and service water piping), that the applicant provide the basis for concluding that the effect of a leak from a component failure in these systems would be limited to direct spray on nearby safety-related components.

In its response dated June 10, 2004, the applicant stated that the method for nonsafety-related components having either functional or spatial impacts on safety-related components is very

similar to the first method given above, in that Section 2.3.3.11 of the LRA provides all the mechanical systems with components included for 10 CFR 54.4(a)(2). The response to RAI 2.3.3.11-1(c)) provides the plant buildings/areas where these components are located. Section 3.0 of Engineering Report A2-ME-2003-0001-0 addresses the limited population of components in the buildings excluded from review.

With regard to the staff's question about certain systems with the credible potential to cause broad spatial effects through flooding, the applicant stated, in its response dated June 10, 2004, that the engineering report identifies the fire water piping and service water system piping in safety-related buildings that are not already reviewed as part of the system review in LRA Sections 2.3.3.2 and 2.3.3.8, respectively, as within the scope of license renewal per 10 CFR 54.4(a)(2) and subject to an AMR. The applicant stated that the portions of the fire water and service water systems that could cause flooding of safety-related components are within the scope of license renewal and subject to an AMR. Section 2.3.3.11 of the LRA covers these.

Based on its review of the applicant's June 10, 2004 response to RAI 2.3.3.11-1(c)), followup questions, and discussions with the applicant in a subsequent teleconference, the staff reviewed the service water, containment spray, and CVCS mechanical systems in Engineering Report A2-ME-2003-0001-0 to confirm that the applicant has appropriately included components within the scope of license renewal and subject to an AMR, in accordance with the requirements of 10 CFR 54.4(a)(2). On the basis of its review of these mechanical systems, the staff did not find any omissions. The staff concluded that the applicant has appropriately included in the LRA nonsafety-related components within the scope of license renewal and subject to an AMR for these systems.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.11-1(c)) and clarifying questions acceptable, pending the AMR review of these nonsafety-related components within the scope of license renewal and subject to an AMR, in accordance with 10 CFR 54.4(a)(2). Since the applicant has not specifically identified components by component identification number in its response, and the staff did not find any omissions of nonsafety-related components subject to an AMR in accordance with 10 CFR 54.4(a)(2), the staff concluded that the applicant defined the population of components within the scope of license renewal in accordance with 10 CFR 54.4.(a)(2). However, the staff also concluded that the lack of identified component identification numbers may create inconclusive staff AMR reviews of 10 CFR 54.4(a)(2) components. Therefore, the staff considers its concern described in RAI 2.3.3.11-1(c)) and clarifying questions resolved, pending the staff's AMRs of these components. Section 3.3.2.4.11 of this SER provides the staff's AMR reviews of these nonsafety-related components.

2.3.3.11.3 Conclusion

During its review of the information provided in the LRA, UFSAR, engineering report, other site documents, the license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the components of the miscellaneous systems. Therefore, the staff concludes that the applicant has adequately identified the components of the miscellaneous systems that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the miscellaneous systems that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.3.12 Other Miscellaneous Systems

2.3.3.12.1 Summary of Technical Information in the Application

In Section 2.3.3.12 of the LRA, the applicant described other miscellaneous systems. This section discusses various systems within the scope of license renewal with components subject to an AMR that have been included in the mechanical system reviews of other systems or the structural reviews. The system descriptions include discussions of the components subject to an AMR and references to the sections containing the component evaluations. Systems described in this section include the intake structure (ventilation), nitrogen supply, service air, traveling screen wash, and ventilation system.

Intake Structure (Ventilation). The intake structure (ventilation) system consists of ventilation components in the intake structure that support fire protection and service water system functions. The component database classifies these components as intake structure system components, but they are evaluated with the systems supported (see Sections 2.3.3.2 and 2.3.3.8 of this SER). Section 2.4.3 of this SER describes the intake structure itself.

The ventilation supporting the service water pumps is safety related, and therefore the intake structure (ventilation) is within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1). The ventilation for the fire protection components is required for compliance with Commission's regulations for fire protection (10 CFR 50.48), and the system is therefore within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(3).

Nitrogen Supply. The nitrogen supply system provides pressurized nitrogen gas for site components such as the safety injection tanks, the steam generator secondary, and the CVCS charging pump pulsation dampeners and suction stabilizers. The nitrogen supply system also provides nitrogen to safety-related electrical penetrations to prevent leakage under accident conditions. The nitrogen system includes containment penetration components that are required for containment isolation under accident conditions, as well as valves and piping for supplying the nitrogen.

Sections 2.3.2.4, 2.3.3.5, and 2.3.4.1 of this SER evaluate the nitrogen supply system components that are subject to an AMR.

The nitrogen supply system contains safety-related components and is therefore within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1).

Service Air. The service air system provides compressed air for service air outlets located throughout the plant site which will be used for operation of pneumatic tools. The service air system consists of air compressors, air receivers, piping, and valves. The service air system contains several safety-related containment isolation valves, evaluated in Section 2.3.2.4 of this SER. Section 2.3.3.1 of this SER evaluates the safety-related fuel transfer tube gasket air test isolation valve with the spent fuel pool system. The system is within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1).

Traveling Screen Wash. The traveling screen wash system for ANO-2 filters water from Lake Dardanelle before it is supplied to the service water bays. This system code includes two traveling water screens in the ANO-2 intake structure, along with their motors, gearboxes, and

controls and the associated ANO-2 screen wash piping and valves. Water from the ANO-1 screen wash system provides spray water to wash the ANO-2 traveling water screens as they travel past the spray nozzles. The debris can be sluiced to trash collection baskets.

The system contains no safety-related components but is conservatively included in the scope of license renewal to be consistent with the evaluation of the traveling screen wash system in the ANO-1 license renewal SER. No components are subject to an AMR, as they are either active components or do not perform an intended function. Consistent with the ANO-1 license renewal SER, the traveling water screens are considered active devices. The supporting structural components are reviewed as required in structural evaluations.

Ventilation System. The ventilation system provides a suitable environment for equipment and personnel for various structures on the ANO site, including the alternate ac diesel generator building. The system consists of blowers, heating coils, filters, dampers, ductwork, and other miscellaneous mechanical components. The system does not include safety-related components or perform a safety function, but the alternate ac diesel generator building ventilation is required for the alternate ac diesel to function during SBO or for safe shutdown following a fire. Thus, the system contains components that are required for SBO and safe shutdown following a fire and is therefore within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(3). Section 2.3.3.4 of this SER evaluates the alternate ac ventilation components with the alternate ac diesel.

2.3.3.12.2 Staff Evaluation

The staff evaluated LRA Section 2.3.3.12, the UFSAR, and site documentation in its scoping and screening review of other miscellaneous systems. The staff conducted its review, with the support from the site visit and applicant's methodology described in Section 2.3 of this SER, in accordance with the guidance described in Section 2.3 of the SRP-LR.

In the performance of the review, the staff selected system functions described in the UFSAR, in accordance with the requirements of 10 CFR 54.4, and evaluated site documentation to confirm that the applicant did not inadvertently omit from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant identified as having intended functions to confirm that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.12 and site documentation, the staff identified areas in which it needed additional information to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter dated May 11, 2004, the staff issued RAIs, described below, to the applicant concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1).

RAI 2.3-1d

The staff requested that the applicant determine that the LRA has not omitted any other miscellaneous systems' SCs that should be within the scope of license renewal, according to 10 CFR 54.4(a).

Applicant's Response and Staff's Evaluation

In its response, dated May 19, 2004, the applicant stated that, in accordance with 10 CFR 54.21(a)(1), other miscellaneous systems' SCs subject to AMR are those that perform an intended function without moving parts or a change in configuration or properties (i.e., passive) and that are not subject to replacement based on a qualified life or specified time period (i.e., long-lived). Among the systems and structures within the scope of license renewal, the applicant identified the other miscellaneous systems' SCs that are subject to an AMR, in accordance with 10 CFR 54.21, in LRA Tables 2.2-1a, 2.2-1b, and 2.2-3. The applicant conservatively considered them to be within the scope of license renewal for the purpose of identifying SCs that are subject to an AMR.

Based on its review, the staff finds the applicant's response to RAI 2.3-1d acceptable, because the applicant considered all components within the other miscellaneous systems as identified in LRA Tables 2.2-1a and 2.2-1b, and all other miscellaneous systems' structures identified in LRA Table 2.2-3, to be within the scope of license renewal for the purpose of identifying SCs that are subject to AMR. Therefore, the staff's concern described in RAI 2.3-1d is resolved.

RAI 2.3-2

In LRA Section 2.1.1, the applicant stated that it prepared LRA drawings to indicate components subject to an AMR. The applicant did not indicate components for the other miscellaneous systems that are subject to an AMR based only on the criteria of 10 CFR 54.4(a)(2) on the LRA drawings. The staff requested that the applicant determine that the LRA has not omitted any other miscellaneous systems' SCs that should be within the scope of license renewal, according to 10 CFR 54.4(a).

Applicant's Response and Staff's Evaluation

In its response, dated May 19, 2004, the applicant stated that, in accordance with 10 CFR 54.21(a)(1), as given in the response to RAI 2.1.1-2, it considered all components for other miscellaneous systems within the systems identified in LRA Tables 2.2-1a and 2.2-1b, and all structures for the other miscellaneous systems' identified in LRA Table 2.2-3, to be within the scope of license renewal for the purpose of identifying other miscellaneous systems' SCs that are subject to AMR, including components in the system considered only in response to 10 CFR 54.4(a)(2).

Based on its review, the staff finds the applicant's response to RAI 2.3-2 acceptable, because the applicant considered all components within the other miscellaneous systems as identified in LRA Tables 2.2-1a and 2.2-1b, and all other miscellaneous systems' structures identified in LRA Table 2.2-3, to be within the scope of license renewal for the purpose of identifying SCs that are subject to AMR. Therefore, the staff's concern described in RAI 2.3-2 is resolved.

RAI 2.3.3.12-1

License renewal drawing LRA—2260 shows the ventilation for the intake structure, two exhaust fans, shutoff dampers, and associated ducts as subject to an AMR. In UFSAR Section 9.4.6, the applicant stated that exhausted air is replaced through an opening in the roof and two openings in louvered doors. The license renewal drawing does not highlight these openings and fans. The staff determined, from its review of the UFSAR, that the two fans supported by the openings are necessary to ventilate the rooms during a design-basis accident to maintain safe equipment operating temperatures. The staff asked the applicant to justify why the openings which replace the exhausted air are not subject to an AMR.

Applicant's Response and Staff's Evaluation

In its response dated June 10, 2004, the applicant stated that the ventilation intake openings are subject to an AMR as part of the intake structure. Table 2.4-3 of the LRA lists them as support for roof hatches and louvered doors. Based on its review, the staff finds the applicant's response acceptable, because LRA Table 2.4-3 includes the ventilation intake openings within the scope of license renewal and subject to an AMR as part of the intake structure scoping and screening results. Therefore, the staff considers its concern described in RAI 2.3.3.12-1 resolved.

RAI 2.3.3.12-2

License renewal drawing LRA—2260 shows two intake structure exhaust fans as subject to an AMR. The staff requested that the applicant clarify if it included the housings for these fans as a component type in LRA Tables 2.3.3-8 and 3.3.2-8. If not, the staff asked the applicant to update the corresponding tables to include these components.

Applicant's Response and Staff's Evaluation

In its response dated June 10, 2004, the applicant stated that LRA Tables 2.3.3-8 and 3.3.2-8 include the housings for the two exhaust fans, shown on license renewal drawing LRA—2260, as the component type "blower housing." Based on its review, the staff finds the applicant's response acceptable, because LRA Tables 2.3.3-8 and 3.3.2-8 include the two intake structure exhaust fans as the component type "blower housing." The two intake structure exhaust fans are subject to an AMR. Therefore, the staff considers its concern described in RAI 2.3.3.12-2 resolved.

RAI 2.3.3.12-3

Section 2.3.3.12 of the LRA states that the nitrogen supply system contains safety-related components and is therefore within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1). During the December 16, 2003, teleconference between the staff and the applicant, the applicant stated that if a system is determined to be within the scope of license renewal, then it conservatively assumed that all components in that system are within the scope of license renewal. The staff identified portions of the nitrogen supply system that are highlighted on license renewal drawings LRA—2232, LRA—2231, and LRA—2206. However, license renewal drawing LRA—2239 does not highlight the supply lines to the above nitrogen supply system piping; only portions associated with the containment penetrations are

highlighted. The staff asked the applicant to explain why the portions of the nitrogen supply system, in particular the supply lines discussed above as shown on drawing LRA—2239, are not subject to an AMR.

Applicant's Response and Staff's Evaluation

In its response dated June 10, 2004, the applicant stated that the nitrogen supply system is within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1), because it contains safety-related components. However, only those passive and long-lived components that perform a license renewal intended function are subject to an AMR, as stated in 10 CFR 54.21(a). Passive and long-lived components in the containment penetration portion of the supply lines (highlighted on LRA— 2239) perform a containment isolation function and are therefore subject to an AMR. Passive and long-lived nitrogen supply system components, such as those highlighted on license renewal drawings LRA—2232, LRA—2231, and LRA—2206, perform a system-level pressure boundary function for a system with a license renewal intended function and are therefore subject to an AMR. The remainder of the nitrogen supply system (including the nonhighlighted supply lines on drawing LRA—2239) does not perform a license renewal intended function. Thus, passive and long-lived components in the nonhighlighted nitrogen supply lines are not subject to an AMR.

Based on its review, the staff finds the applicant's response to RAI 2.3.3.12-3 acceptable, because the portions of the nitrogen system in question do not perform an intended function per 10 CFR 54.4(a), and therefore are not in scope and subject to an AMR. Therefore, the staff considers its concern described in RAI 2.3.3.12-3 resolved.

On November 1 through 5 and 15 through 19, 2004, the NRC staff performed an AMP inspection at ANO-2 during which the staff reviewed the procedures for implementing AMP's for mechanical components. During the inspection, the NRC staff noted that some component types added to the scope of license renewal as result of the applicant's response to RAI 2.1-4, part a were not included in the appropriate tables in LRA Sections 2.3 and 3.3. During a follow-up inspection on February 16 and 17, 2005, the inspectors confirmed that the applicant had identified the components that were omitted from the tables. These components were listed in a supplemental table and included in a letter from the applicant dated February 28, 2005. The aging management reviews for these components are included in Section 3 of this SER. The issue associated with this inspection item is closed.

2.3.3.12.3 Conclusion

During its review of the information provided in the LRA, UFSAR, site documentation, the license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the components of the other miscellaneous systems addressed in the LRA. Therefore, the staff concludes that the applicant has adequately identified the components of the other miscellaneous systems that are within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the components of the other miscellaneous systems that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.4 Steam and Power Conversion Systems

In Section 2.3.4 of the LRA, the applicant identified the SCs of the steam and power conversion systems that are subject to an AMR for license renewal. The applicant described the following steam and power conversion systems:

- main steam
- main feedwater
- emergency feedwater

2.3.4.1 Main Steam

2.3.4.1.1 Summary of Technical Information in the Application

In Section 2.3.4.1 of the LRA, the applicant described the main steam system. The main steam system conveys steam from the steam generators to the turbine generator and to other auxiliary equipment for power generation. The main steam system supplies steam to the high-pressure turbine and to the moisture separator reheaters during normal plant operation, to the turbine gland seals during low loads, and to the main feedwater pump steam turbine drivers during low loads or whenever low-pressure steam is not sufficient. The main steam system provides steam to the supply header for the turbine-driven emergency feedwater pump turbine that is required for accident conditions and for safe shutdown following a fire.

The main steam system forms part of the closed system inside containment for containment integrity under accident conditions. This system contains nonsafety-related components, evaluated in Section 2.3.3.11 of this SER, whose failure could impact safety-related components.

This system provides main steam pressure control following a fire to control the cooldown of the RCS. The local control of the atmospheric dump valve or its upstream isolation valve will control the steaming rate and the plant cooldown rate for safe shutdown.

Certain components in the nitrogen supply system are evaluated with the main steam system. These components are associated with the nitrogen supply to the secondary side of the steam generator. Certain emergency feedwater components in the main steam supply to the emergency feedwater turbine are also evaluated with the main steam system, as are components from the steam generator secondary/blowdown system.

The main steam system is within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1–3).

In Table 2.3.4-1 of the LRA, the applicant identified the main steam system component types that are within the scope of license renewal and subject to an AMR, including bolting, expansion joint, orifice, piping, steam trap, thermowell, tubing, and valve.

2.3.4.1.2 Staff Evaluation

The staff reviewed LRA Section 2.3.4.1, ANO-2 UFSAR Sections 10.3, 15.1.14, and 3.6.4.1, and site documentation in its scoping and screening review of the main steam system. The staff conducted its review, with support from the plant audit and the applicant's methodology described in Section 2.3 of this SER, in accordance with the guidance described in Section 2.3 of the SRP-LR.

In the performance of its review, the staff selected system functions described in the UFSAR, in accordance with the requirements of 10 CFR 54.4, and evaluated site documents to confirm that the applicant did not inadvertently omit from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). In LRA Section 2.3.3.11, the applicant separately compiled scoping and screening results for all components with intended functions that are within the scope of license renewal, per 10 CFR 54.4(a)(2). The staff reviews those components for the main steam system in Section 2.3.3.11 of this SER. The staff then reviewed those components that the applicant identified as having an intended function to confirm that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.4.1 and site documentation, the staff identified an area in which it needed additional information to complete its evaluation of the applicant's scoping and screening results. Therefore, by letter dated May 11, 2004, the staff issued an RAI, described below, to the applicant concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1).

RAI 2.3.4.1-1

Section 10.2.3.1 of the UFSAR states that a venturi flow element and a flow restrictor are installed in each main steamline and steam generator outlet nozzle, respectively, to limit the blowdown rate following a main steamline break. Table 2.3.4-1 of the LRA lists the component type "orifice," which would include the venturi flow element and the flow restrictor, as subject to an AMR. However, the table lists "pressure boundary" as the only intended function of the component type "orifice" and neglects to list "flow control" as an intended function. The staff asked the applicant to justify not listing flow control as an intended function of the component type "orifice" in the table or revise the table accordingly.

Applicant's Response and Staff's Evaluation

In its response dated June 10, 2004, the applicant stated that, as described in the third paragraph of UFSAR Section 10.3.2.1, "The venturi flow element can also function to limit the blowdown rate following a postulated pipe rupture in the main steam line; however, the main steam flow restrictors installed in the steam generator outlet nozzles are credited with performing this function." The applicant further stated that, because the UFSAR states that the venturi (orifice) is not credited with the function of flow control, LRA Table 2.3.4-1 does not list the intended function of flow control. Table 2.3.1-5 of the LRA includes the main steamflow restrictors in the steam generator in the RCS as flow-limiting inserts with the intended functions of flow control and pressure boundary.

Based on its review, the staff finds the applicant's response to RAI 2.3.4.1-1 acceptable, because the flow control function of the flow restrictors is included in the AMR for the steam generators. Since the applicant did not credit the venturi in the accident analysis, LRA Table 2.3.4-1 need not include the intended function of flow control for the venturi component. Therefore, the staff considers its concern described in RAI 2.3.4.1-1 resolved.

2.3.4.1.3 Conclusion

During its review of the information provided in the LRA, UFSAR, site documentation, the license renewal drawings, and the licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the components of the main steam system. Therefore, the staff concludes that the applicant has adequately identified the components of the main steam system that are within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the components of the main steam system that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.4.2 Main Feedwater

2.3.4.2.1 Summary of Technical Information in the Application

In Section 2.3.4.2 of the LRA, the applicant described the main feedwater system, which provides feedwater to the steam generators to support normal operations. The main feedwater system provides a flowpath for emergency feedwater to the steam generators and isolates feedwater flow to the steam generators during a main steam or feedwater line break event or containment over pressurization. The system comprises two interconnected trains, consisting of steam-driven main feedwater pumps, pump recirculation valves, feedwater flow control valves, feedwater heaters, feedwater block valves, vent and drain valves, and associated piping and tubing.

The main feedwater system is largely nonsafety related but has a safety-related portion that provides isolation to the steam generators following a main steam or feedwater line break or containment building overpressure condition. The safety-related portion of the system is the piping and related equipment, starting with the main feedwater block valve closest to containment and continuing to the steam generators. The second block valve (outboard) on each train is also safety related, but the piping and valves between the two block valves are not safety related.

This system contains nonsafety-related components, evaluated in Section 2.3.3.11 of this SER, whose failure could impact safety-related components. The main feedwater block valves, piping, and steam generators, which are credited in conjunction with main steam for RCS decay heat removal for safe shutdown after a fire, provide the pressure boundary integrity for feedwater. These components perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48).

Steam generator water-level monitoring components, which are classified as part of the steam generator secondary/blowdown system, are evaluated with the main feedwater system. These components provide monitoring of the steam generator water-level for power operations and safe plant shutdown.

The main feedwater system is within the scope of license renewal, based on the criteria of 10 CFR 54.4(a)(1–3).

In Table 2.3.4-2 of the LRA, the applicant identified the main feedwater system component types that are within the scope of license renewal and subject to an AMR, including bolting, piping, tubing, and valve.

2.3.4.2.2 Staff Evaluation

The staff reviewed LRA Section 2.3.4.2, ANO-2 UFSAR Sections 10.4.7, 15.1.14, and 3.6.4.1, and site documentation in its scoping and screening evaluation of the main feedwater system. The staff conducted its review, with support from the plant audit and the applicant's methodology described in Section 2.3 of this SER, in accordance with the guidance described in Section 2.3 of the SRP-LR.

In the performance of its review, the staff selected system functions described in the UFSAR, in accordance with the requirements of 10 CFR 54.4, and reviewed site documents to determine that the applicant did not inadvertently omit from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). In LRA Section 2.3.3.11, the applicant separately compiled scoping and screening results for all components with intended functions that are within the scope of license renewal, per 10 CFR 54.4(a)(2). The staff reviews those components for the main feedwater system in Section 2.3.3.11 of this SER. The staff then reviewed those components that the applicant identified as having an intended function to determine that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

The main feedwater system is largely nonsafety related, except for a portion of piping between the steam generators and the outboard containment isolation valves. The license renewal drawings highlight the safety-related portion of the main feedwater piping within the scope of license renewal and subject to an AMR. As stated in the UFSAR, the portions of the nonsafety-related piping have been analyzed to withstand design-basis earthquake loads. Although the applicant has not highlighted license renewal drawings nor identified, in the LRA, the specific main feedwater components within the scope of license renewal meeting the criteria of 10 CFR 54.4(a)(2), the applicant stated in LRA Section 2.1.1.2.2 that if a HELB analysis assumes that nonsafety-related piping does not fail or assumes failure only at specific locations, then that piping system is within the scope of license renewal per 10 CFR 54.4(a)(2) and subject to an AMR, in order to provide confirmation that those assumptions remain valid through the period of extended operation. Section 2.1.1.2.2 of the LRA also states that nonsafety-related systems and nonsafety-related portions of safety-related systems containing steam or liquid that are near safety-related equipment are considered in scope and subject to an AMR, per 10 CFR 54.4(a)(2). Therefore, the staff considers that the LRA properly addresses nonsafety-related components.

In its review of LRA Section 2.3.4.2 and site documentation, the staff identified an area in which it needed additional information to complete its evaluation of the applicant's scoping and screening results. Therefore, by letter dated May 11, 2004, the staff issued an RAI, described below, to the applicant concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1).

RAI 2.3.4.2-1

Section 2.3.4.2 of the LRA states that the second block valve (outboard) on each train of the main feedwater system is safety related. The staff identified that license renewal drawing LRA—2206 does not highlight the outboard block valves as subject to an AMR. In UFSAR Section 15.1.14, the applicant identified these valves (as the backup main feedwater isolation valves) as receiving an isolation signal to close during steamline breaks (either via the main steam isolation signal or the containment spray actuation signal). The UFSAR Chapter 15 analyses credit these valves. The staff asked the applicant to justify its exclusion of the outboard second feedwater block valve from the scope of license renewal, and of its valve body from an AMR.

Applicant's Response and Staff's Evaluation

In its response dated June 10, 2004, the applicant stated that the second (outboard) block valves are within the scope of license renewal (as part of the main feedwater system) but are not subject to an AMR as they perform their intended function with moving parts. The applicant further stated that the only intended function of these outboard block valves is to provide feedwater isolation, which relies on the closure of the valve disc by the motor operator. The loss of pressure boundary in this portion of the system would not prevent satisfactory isolation of feedwater flow to the steam generators.

Based on its review of the applicant's response and a teleconference with the applicant, the staff asked the applicant to clarify its response to RAI 2.3.4.2-1. The staff stated that since the valve is safety related, the valve body should be subject to an AMR by definition, according to 10 CFR 54.4(a)(1). The staff asked the applicant to specifically discuss and cite the process used to screen out the outboard block valves in accordance with 10 CFR 54.21(a)(2).

By letter dated July 22, 2004, the applicant revised its response to RAI 2.3.4.2-1 to include the statement, "These valves perform their function with moving parts, and in accordance with 10 CFR 54.21(a)(1)(i), are not subject to aging management review."

Based on its review, the staff finds the applicant's revised response to RAI 2.3.4.2-1 unacceptable, because the intended function of the outboard block valves (to provide satisfactory isolation of feedwater flow to the steam generators) does require the integrity of the valve. The 10 CFR Part 54 SOC (September 29, 1995) states the following:

> However, pressure-retaining boundaries (e.g., pump casings, valve bodies, fluid system piping) and structural supports (e.g., diesel generator structural supports) that are necessary for the structure or component to perform its intended function meet the description of passive, and will be subject to an aging management review.

Furthermore, the main feedwater block valves provide pressure boundary integrity for the feedwater system following a fire and satisfy the criteria in 10 CFR 54.4(a)(3). The applicant did not identify this function. Therefore, pressure boundary integrity of the outboard valve is required. As such, the valves (bodies) in question should be subject to an AMR. The staff asked the applicant to justify its exclusion of the outboard valve from an AMR.

In a letter dated September 10, 2004, the applicant stated that these valves are within the scope of license renewal and subject to an AMR as part of the nonsafety-related piping and supports up to and including the first equivalent anchor beyond the safety-related interface. The staff found the applicant's response acceptable because the applicant has included these outboard valves in scope and subject to an AMR for license renewal to meet 10 CFR 54.4(a)(2) criterion. Therefore, the issues associated with RAI 2.3.4.2-1 are resolved.

2.3.4.2.3 Conclusion

During its review of the information provided in the LRA, UFSAR, site documentation, the license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the components of the main feedwater system. Therefore, the staff concludes that the applicant has adequately identified the components of the main feedwater system that are within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the components of the main feedwater system that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.4.3 Emergency Feedwater

2.3.4.3.1 Summary of Technical Information in the Application

In Section 2.3.4.3 of the LRA, the applicant described the emergency feedwater system. The emergency feedwater system provides a safety-related source of feedwater to the steam generators when main feedwater is not available. The system is the safety-related source of feedwater for cooling during design-basis events and is credited with operation for safe shutdown following a fire.

The emergency feedwater system consists of two safety-related pumps (one turbine-driven and one motor-driven), a third nonsafety-related auxiliary feedwater pump, and two independent feedwater trains, each capable of supplying feedwater to either of the two steam generators. The condensate storage tanks, backed up by the safety-related service water system, supply the emergency feedwater system.

The evaluation of the emergency feedwater system includes the condensate storage and transfer system. The condensate storage and transfer system consists of two condensate storage tanks, two condensate transfer pumps, and associated piping, controls, and instrumentation. The safety-grade condensate storage tank is connected to the Unit 2 emergency feedwater system as an available source of emergency feedwater. Locked, closed, double isolation valves isolate it from the system.

This system contains nonsafety-related components, evaluated in Section 2.3.3.11 of this SER, whose failure could impact safety-related components. The emergency feedwater system is required for compliance with the Commission's regulations for fire protection (10 CFR 50.48).

Section 2.3.3.8 of this SER evaluates the emergency feedwater suction supply valves from the service water system with the service water system because of the raw water environment internal to these valves. Section 2.3.4.1 evaluates certain emergency feedwater components in the main steam supply to the emergency feedwater turbine with the main steam system. The

emergency feedwater system is within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1–3).

In Table 2.3.4-3 of the LRA, the applicant identified the emergency feedwater system component types that are within the scope of license renewal and subject to an AMR, including bearing housing, bolting, equalizer pipe, filter housing, governor housing, heat exchanger (tubes), heat exchanger (tubesheet), heater housing, orifice, piping, pump casing, servo housing, sight glass, sight glass (housing), steam trap, tank, thermowell, tubing, turbine casing, and valve.

2.3.4.3.2 Staff Evaluation

The staff reviewed LRA Section 2.3.4.3, ANO-2 UFSAR Sections 9.2.6, 10.4.9, 15.1.14, and 3.6.4.1, and site documentation in its scoping and screening review of the emergency feedwater system. The staff conducted its review, with support from the plant audit and the applicant's methodology described in Section 2.3 of this SER, in accordance with the guidance described in Section 2.3 of the SRP-LR.

In the performance of its review, the staff selected system functions described in the UFSAR, in accordance with the requirements of 10 CFR 54.4, and evaluated site documents to determine that the applicant did not inadvertently omit from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). In LRA Section 2.3.3.11, the applicant separately compiled scoping and screening results for all components with intended functions that are within the scope of license renewal, per 10 CFR 54.4(a)(2). The staff reviews those components for the emergency feedwater system in Section 2.3.3.11 of this SER. The staff then reviewed those components that the applicant identified as having an intended function to determine that the applicant did not omit any passive and long-lived components that should be subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.4.3 and site documentation, the staff identified areas in which it needed additional information to complete its evaluation of the applicant's scoping and screening results. Therefore, by letter dated May 11, 2004, the staff issued RAIs, described below, to the applicant concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4 and the screening criteria of 10 CFR 54.21(a)(1).

RAI 2.3.4.3-1

License renewal drawing LRA—2204 does not show the nonsafety-related auxiliary feedwater pump and its auxiliaries as subject to an AMR. In UFSAR Section 10.4.9.2, the applicant stated that the auxiliary feedwater pump provides feedwater to the steam generators when both safety-related emergency feedwater pumps are not available. In UFSAR Section 3.6.4.1.5.2, the applicant stated that a HELB is postulated in the common 4-in. steamline from both the steam generators at valve 2CV-0340-2 (license renewal drawing LRA—2202). The staff noted that, as a result of a postulated HELB, the turbine driven emergency feedwater pump would not be available to supply feedwater to the steam generators. In UFSAR Section 3.6, the applicant stated that a single failure of the remaining emergency feedwater pump would require the auxiliary feedwater pump to provide feedwater to the steam generators to bring the plant to safe-shutdown conditions.

However, the staff noted that UFSAR Section 3.6 does not explain how this postulated break would achieve plant safe shutdown. The staff also noted that, if the auxiliary feedwater pump is used to mitigate the consequences of a postulated HELB in the UFSAR, then the auxiliary feedwater pump should be within the scope of license renewal to meet the criteria of 10 CFR 54.4(a)(2). The staff asked the applicant to justify the exclusion of the auxiliary feedwater pump and its auxiliaries from an AMR.

Applicant's Response and Staff's Evaluation

In its response dated June 10, 2004, the applicant stated that UFSAR Section 3.6.4.1.5.2 notes that a break in the 4-in. steamline to the emergency feedwater pump driver will not require safety system actuation since the blowdown in the line is within the makeup of the main feedwater pumps to the steam generators. Isolation valves are available in the lines from the individual steam generators to isolate a break in the common steamline. The auxiliary feedwater pump and its auxiliaries are not subject to an AMR since the auxiliary feedwater pump and its auxiliaries have no intended functions that support the functions in the scoping criteria of 10 CFR 54.4(a)(1–3).

Based on its review, the staff finds the applicant's response to RAI 2.3.4.3-1 acceptable, because if the safety system actuation would not occur, there would be no need to assume a plant trip and postulate the failure of the remaining emergency feedwater pump. The plant could be shut down using nonsafety-related systems. Therefore, the staff considers its concern described in RAI 2.3.4.3-1 resolved.

RAI 2.3.4.3-2

License renewal drawing LRA—2204 shows only a portion of the minimum recirculation lines (upstream of valves 2EFW10A and 2EFW10B) as subject to an AMR. These valves are throttling valves, which do not necessarily provide an adequate pressure boundary function. The minimum recirculation piping extends beyond this drawing to another drawing, —2229, which the applicant did not provide. Failure of the downstream piping could result in a loss of pressure boundary intended function. The staff asked the applicant to provide drawing —2229 so that the staff can determine if any passive failures downstream could affect the intended function of the emergency feedwater system. The staff stated that, if passive failures (e.g., piping or valve failures) downstream could affect the intended function of the emergency feedwater system, then the applicant should include these components within the scope of license renewal and as subject to an AMR.

Applicant's Response and Staff's Evaluation

In its response dated June 10, 2004, the applicant stated that each minimum recirculation line contains an orifice and globe valve. The orifices allow the minimum required recirculation flow for the pumps while ensuring that sufficient flow is provided to the steam generators, as required for design-basis events. Thus, piping and components downstream of the orifices and globe valves are not required to maintain pressure boundary for the steam generators to receive sufficient flow for design-basis events, and they do not have an intended function based on the criteria of 10 CFR 54.4(a)(1) or 10 CFR 54.4(a)(3).

Passive components in the minimum recirculation line downstream of 2EFW10A and 2EFW10B do have a pressure boundary intended function for 10 CFR 54.4(a)(2). In accordance with LRA Section 2.1.1, the license renewal drawings do not indicate components subject to an AMR based only on the criteria of 10 CFR 54.4(a)(2). Table 3.3.2-11 of the LRA lists the nonsafety-related portions of the emergency feedwater system that are subject to an AMR based on the criteria of 10 CFR 54.4(a)(2).

Based on its review, the staff finds the applicant's response acceptable, because the applicant has evaluated the nonsafety-related piping for potential spatial interaction with safety-related SSCs, as addressed in Section 2.3.3.11 of this SER. Therefore, the staff considers its concern described in RAI 2.3.4.3-2 resolved.

2.3.4.3.3 *Conclusion*

During its review of the information provided in the LRA, UFSAR, site documentation, the license renewal drawings, and licensing basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the components of the emergency feedwater system. Therefore, the staff concludes that the applicant has adequately identified the components of the emergency feedwater system that are within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the components of the emergency feedwater system that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4 Scoping and Screening Results—Structures

Pursuant to 10 CFR 54.21(a)(1), an applicant must identify and list SCs subject to an AMR. These are passive, long-lived SCs that are within the scope of license renewal. To determine that the applicant has properly implemented its methodology, the staff focuses its review on the implementation results. Such a focus allows the staff to confirm that the applicant has not omitted any structural components that are subject to an AMR. If the review identifies no omission, the staff has a basis to find that the applicant has identified the structural components that are subject to an AMR.

This SER section addresses the applicant's scoping and screening results for structures. Table 2.2-3 of the LRA identifies the following structures as within the scope of license renewal:

- containment and containment internals (LRA Section 2.4.1)
  - containment building
  - polar crane
- auxiliary building, turbine building, and yard structures (LRA Section 2.4.2)
  - alternate ac diesel generator building
  - auxiliary building
  - condensate storage tank T-41B foundation and pipe trenches
  - electrical manholes
  - emergency diesel fuel oil storage tank vault
  - fuel handling/refueling machines
  - fuel oil storage tank (T-25) foundation
  - postaccident sampling system building
  - RWT (2T3) foundation
  - switchyard/transformer yard
  - turbine building
- intake structure and emergency cooling pond (LRA Section 2.4.3)
  - emergency cooling pond
  - intake canal
  - intake structure
- bulk commodities (LRA Section 2.4.4)
  - fire fighting equipment hose reels
  - pipe hangers—plant systems

Sections 2.4.1, 2.4.2, 2.4.3, and 2.4.4 and Tables 2.4-1, 2.4-2, 2.4-3, and 2.4-4 of the LRA provide detailed lists of structures and structural components included in each of these four groups.

Table 2.2-4 of the LRA identifies the ANO-2 structures that the applicant has determined are not within the scope of license renewal. In reviewing LRA Table 2.2-4, the staff identified several areas in which it needed additional information to complete its evaluation of the applicant's scoping results. Therefore, by letter dated April 14, 2004, the staff issued RAI 2.4-1, given below, to the applicant concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a):

(a) LRA Table 2.2-4 identifies structures that are not within the scope of license renewal. It is not obvious to the staff that all of the listed structures serve no intended function. Please provide a description of the discharge canal and the miscellaneous tank foundations, and the technical basis for the determination that they are not within the scope of license renewal.

(b) Verify that seismic II/I considerations are not applicable to any of the structures listed in LRA Table 2.2-4 (e.g., cooling tower).

(c) In addition, while the staff acknowledges that the tendon access gallery does not serve an intended function in the strictest interpretation of the License Renewal Rule, there is significant industry operating experience related to flooding and corrosive environments in the tendon access gallery that have contributed to degradation of the tendon anchorage components and surrounding concrete. Management of the condition of the tendon access gallery is a preventive step to minimize aging effects for the prestressing system. The applicant is requested to submit its plant-specific operating/aging experience related to (1) flooding and corrosive environments in the tendon access gallery, and (2) degradation of the prestressing system components (both steel and concrete) in the tendon access gallery, and based on the ANO-2 specific tendon gallery operating/aging experience, discuss ANO-2's basis for not including the tendon gallery structure within the AMR scope pursuant to 10 CFR 54.4(a)(2).

The following is the applicant's response to RAI 2.4-1, dated May 19, 2004:

(a) The discharge canal is an earthen structure with the primary function of discharging the ANO-1 condenser cooling water to the lake. As stated in ANO-2 Safety Analysis Report (SAR) Section 9.2.1.2.3.7, "Under accident conditions the service water system (SWS) discharge is automatically changed to the emergency cooling pond (ECP) upon the initiation of a safety injection actuation signal (SIAS) or main steam isolation signal (MSIS)." The discharge canal is not relied on as a discharge path for the service water system. Failure of discharge canal will not prevent accomplishment of required safety functions; therefore, the discharge canal has no intended function.

Miscellaneous tank foundations are reinforced concrete foundations for miscellaneous, nonsafety related tanks. Since the tanks have no intended functions, the foundations supporting them likewise have no intended functions. Examples of miscellaneous tanks are raw water holdup tank and concentrator bottoms tank. The raw water holdup tank holds water supplied from the Russellville city water system. It supplies

the domestic water system that does not serve a safety-related function and is not required for safe shutdown of the plant. The concentrator bottoms tank is no longer in service. Neither of these examples are tanks with the potential for failures that could prevent the satisfactory accomplishment of safety functions. The foundations supporting an intended function are provided in Table 2.2-3 of the LRA.

(b) As part of LRA process, the structures (e.g., cooling tower) listed in LRA Table 2.2-4 have been reviewed for II/I considerations. Those structures required to be seismically qualified for II/I considerations have been included in the scope of license renewal. None of the structures listed in LRA Table 2.2-4 are a concern for seismic II/I considerations.

(c) Prestressing system components in the tendon access gallery are protected by end caps as appropriate. ANO-2 operating experience indicates no significant problems with prestressing system components due to flooding or corrosive environments in the tendon access gallery. The ANO-2 containment building 20-year tendon surveillance and concrete surface inspection indicated no abnormal degradation of the building or the post tensioning system. The gallery is open to the auxiliary building. Tendon access gallery ventilation fans operate in conjunction with the auxiliary building ventilation system so the environment is essentially the same as the auxiliary building environment. Since the tendon anchorages are in the overhead of the gallery, minor water inleakage has no effect on the lower tendon anchorage components and surrounding concrete. Neither significant levels of contaminants nor excessive humidity have been noted in the tendon access gallery.

The tendon access gallery provides no structural support to the reactor building. Since the tendon access gallery serves no license renewal intended function, it is not within the scope of license renewal and therefore, not subject to an aging management review.

Based on its review, the staff finds the applicant's response to RAI 2.4-1 parts (a), (b), and (c)) acceptable, because the information submitted is sufficient to address the staff's concern. The applicant has provided in part (a) an adequate description and technical basis for its determination that the discharge canal and the miscellaneous tank foundations are not within the scope of license renewal. The applicant has verified in part (b) that none of the structures listed in LRA Table 2.2-4 are a concern for seismic Category II/I considerations. The applicant has submitted in part (c)) a sufficient description of plant-specific operating/aging experience related to environmental degradation of the tendon access gallery and its prestressing system components. The tendon access gallery is ventilated and has not experienced any significant degradation that could potentially compromise the prestressing system components. The staff concludes that there is not a sufficient technical basis to include the tendon gallery structure within the license renewal scope, pursuant to 10 CFR 54.4(a)(2). Therefore, the staff considers its concern described in RAI 2.4-1 parts (a), (b), and (c)) resolved.

Load-handling systems have components that are both mechanical and structural in nature. The structural components are passive and long-lived. If a specific load-handling system serves an intended function, then it is subject to an AMR. To ensure a complete understanding of the ANO-2 scoping and screening for load-handling systems, the staff needed additional information. Therefore, by letter dated April 14, 2004, the staff issued RAI 2.4-3, given below, to the applicant concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1):

> Please clarify the complete scope of load handling systems included in the ANO-2 LR scope. LRA Subsections 2.4.1, 2.4.2, 2.4.3 and 2.4.4 all make reference to one or more components of various load handling systems. In addition, LRA Section 2.1.1.2.2 states "The overhead-handling systems, whose structural failure could result in damage to any system that could prevent the accomplishment of a safety function, meet the criteria of 10CFR54.4(a)(2) and are within the scope of license renewal." The applicant is requested to (1) provide a listing of all load handling systems in the LR scope; (2) define the associated intended function; (3) identify the specific components that are subject to an AMR, for each in-scope load handling system; (4) identify the specific row in Table 2.4-1, 2.4-2, 2.4-3, or 2.4-4 that includes each identified component; and (5) identify the location in LRA Section 3 that contains the AMR for each component.

The applicant's response to RAI 2.4-3, dated May 19, 2004, is given below:

(1) The load handling systems included in the ANO-2 license renewal scope include the polar crane, fuel handling bridge, and spent fuel cranes (includes bridges, girders, trolleys and crane rails). Also included are monorails and their supports which meet the criteria of 10CFR54.4(a)(2).

(2) As shown in Tables 2.4-1, 2.4-2, and 2.4-4 of the LRA, the intended function of cranes and crane components is either support of a 10 CFR 54.4(a)(1) or 10 CFR 54.4(a)(2) function.

(3) The specific components, listed in the LRA as crane rails and support structures associated with the crane or monorail system, includes bridge, trolley, rails, and girders.

(4) The specific row in Table 2.4-1, 2.4-2, and 2.4-4 that includes each identified component are as follows:

Table 2.4 1 under "Polar crane (containment)"
Table 2.4 2 under "Fuel handling bridge assembly (2H3) crane rails and girders"
Table 2.4 2 under "Spent fuel overhead cranes (L3 and 2L35)"
Table 2.4 4 under "Monorails, crane rails and girders"

(5) Line items listed above are shown in Tables 3.5.2-1, 3.5.2-2, and 3.5.2-4 of the LRA under the same component entry.

Based on its review, the staff finds the applicant's response to RAI 2.4-3 acceptable, because the information submitted is sufficient to address the staff's concern. The applicant has adequately clarified (1) the complete scope of load-handling systems included in the ANO-2 license renewal scope, (2) intended functions, (3) the specific crane components subject to an AMR, (4) the scoping and screening references in LRA Section 2.4, and (5) the AMR references in LRA Section 3.5. The staff concludes that the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1) to the ANO-2 load-handling systems. Therefore, the staff considers its concern described in RAI 2.4-3 resolved.

2.4.1 Staff Evaluation Methodology

The staff performed its evaluation of the information provided in the LRA in the same manner for all SCs. Through its review, the staff sought to determine if the applicant identified the components and supporting structures for a specific containment structure or support that appear to meet the scoping criteria specified in the Rule as within the scope of license renewal, in accordance with 10 CFR 54.4. Similarly, the staff evaluated the applicant's screening results to determine that all long-lived, passive components are subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

To perform its scoping evaluation, the staff reviewed the applicable LRA section and associated component drawings, focusing its review on components that the applicant did not identify as within the scope of license renewal. The staff reviewed relevant licensing basis documents, including the UFSAR, for each SC to determine if the applicant had omitted system components with intended functions delineated under 10 CFR 54.4(a) from the scope of license renewal. The staff also reviewed the licensing basis documents to determine if the LRA specifies all intended functions delineated under 10 CFR 54.4(a). If it identified omissions, the staff requested additional information to resolve the discrepancy.

Once the staff completed its review of the scoping results, it evaluated the applicant's screening results. For those SCs with intended functions, the staff sought to determine if they perform their functions with moving parts or a change in configuration or properties, or if they are subject to replacement based on a qualified life or specified time period, as described in 10 CFR 54.21(a)(1). For those that do not meet either of these criteria, the staff sought to confirm that these SCs are subject to an AMR, as required by 10 CFR 54.21(a)(1). If it identified discrepancies, the staff requested additional information to resolve them.

2.4.2 Containment and Containment Internals

In Section 2.4.1 of the LRA, the applicant described the containment and containment internals.

2.4.2.1 Summary of Technical Information in the Application

The ANO-2 containment is a seismic Category 1, fully continuous, reinforced prestressed concrete cylindrical structure with a shallow dome roof and a mat foundation slab. The containment completely encloses the containment internals, the reactor vessel, and the RCS along with other vital electrical, mechanical, instrumentation, and structural components. The containment consists of (1) a flat circular base slab, (2) a right circular cylinder, and (3) a

sphere-torus dome. It is constructed of reinforced concrete, prestressed by posttensioned tendons in the cylinder and the dome.

The containment houses the containment internal structures. The internal structures consist of the primary shield, secondary shield, refueling canal, removable missile shield above the reactor vessel, floor slabs, gratings and platforms, and equipment supports. Structures associated with the containment internals comprise structural members such as beams, girders, joists, columns, base plates, bearing plates, bracing, splice assemblies, connections, and other related steel items. The major structural steel components consist of the upper steam generator and RCP restraints, lower steam generator support (which includes steam generator support steel), reactor support, and pressurizer support steel.

The containment structure limits the release of radioactive fission products following an accident to reduce the dose to the public and the control room operators. The containment structure also provides physical support for itself, the RCS, engineered safety features, and other systems and equipment within the structure. The exterior walls and dome protect the reactor vessel and other safety-related SSCs from missiles (internal and external) and natural phenomena.

The applicant evaluated the following SSCs for the containment building:

- anchors/embedments/attachments for systems/components
- building foundations
- concrete beams
- containment concrete cylinder wall
- containment dome, includes coatings on roof
- containment sump structure (excluding piping, equipment, instrumentation, and controls associated with the sump)
- doors/hatches and hatch covers
- equipment hatch
- exterior and interior concrete walls
- floor and roof slabs
- fuel handling bridge, crane rails and supports
- fuel transfer canal (excludes tube portion and flanges)
- mechanical and electrical penetrations
- missile shield walls

- personnel airlock, emergency airlock
- pipe supports, cable trays, and other equipment supports (includes whip restraints) and conduits
- polar crane rails and crane support structures
- radiation shield walls
- reactor vessel closure head lifting rig assembly structure and miscellaneous components
- reactor structural supports (concrete and steel)
- stairways, platforms, ladders, handrails, gratings, and catwalks
- steam generator structural supports (concrete and steel)
- steel floor framing, columns, and bracing
- steel beams
- structural bolting
- structural steel that supports grating and catwalks, service platforms, ladders, and stairs (required for general access)
- structural steel members and shapes (includes steam generator, pressurizer, reactor vessel, RCPs, and safety injection tank support steel)
- tank supports (concrete and steel)

The supports for the RCS components (the reactor vessel, RCPs, steam generators, and pressurizer) are considered unique and are included in this evaluation. The bulk commodity evaluation addresses other component and piping supports, including RCS piping supports.

In Table 2.4.1 of the LRA, the applicant identified the containment structure components types that are within the scope of license renewal and subject to an AMR, including anchorage/embedment/attachments, CEDM support structure, electrical penetrations, equipment hatch, fuel handling bridge, crane rails and supports, liner plate, mechanical penetrations, personnel airlocks, polar crane (containment), pressurizer support steel, reactor vessel support column, refuel maintenance support structure, steam generator support, structural steel, sump penetrations, tendon anchorage, tendon wires, reactor vessel support bolted connections, various threaded fasteners, basement floor slab (includes sump and instrumentation tunnel), columns, other walls, hatches, dome, cylinder wall, buttress, ring girder, foundation, subfoundation, pressurizer support foundation, primary and secondary shield walls, reactor vessel missile shield, refuel canal, steam generator support foundation, and reactor vessel support foundation.

2.4.2.2 Staff Evaluation

The staff reviewed LRA Section 2.4.1 and the referenced ANO-2 UFSAR Sections 3.8.1 and 3.8.3. The staff conducted its review in accordance with the guidance described in Section 2.4 of the SRP-LR.

In the performance of the review, the staff evaluated the UFSAR to determine if the applicant failed to identify any structural or component functions of the containment and containment internals as an intended function, in accordance with the requirements of 10 CFR 54.4(a). The staff did not identify any omissions. The staff then verified that the passive, long-lived components are subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.1 identified an area in which it needed additional information to complete its evaluation of the applicant's scoping results. Therefore, by letter dated April 14, 2004, the staff issued RAI 2.4-6 (part b), given below, to the applicant concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a):

> UFSAR Table 3.8-1 lists "Flued Head Penetrations" for the Containment. The applicant is requested to (1) verify that all of the listed penetrations are within the LR scope; and (2) if not, then provide the technical basis for any exclusions.

The applicant's response to RAI 2.4-6 (part b), dated May 19, 2004, is given below:

> All containment penetrations are within the scope of license renewal and subject to aging management review as indicated in LRA Table 2.4-1.

Based on its review, the staff finds the applicant's response to RAI 2.4-6 (part b) acceptable, because it verifies that all containment penetrations are within the scope of license renewal and subject to an AMR. The staff concludes that the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) to the ANO-2 containment penetrations. Therefore, the staff considers its concern described in RAI 2.4-6 (part b) resolved.

The staff's review of the LRA Section 2.4.1 identified a second area in which it needed additional information to complete its evaluation of the applicant's scoping results. Therefore, by letter dated April 14, 2004, the staff issued RAI 2.4-8, given below, to the applicant concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a):

> Section 2.4 of the LRA does not describe the cable feed-through assembly, which is part of containment electrical penetrations. This assembly serves a pressure boundary intended function. Therefore, the applicant is requested to clarify whether the cable feed-through assembly is in scope or not. If it is in scope, identify the applicable table number and component name in LRA Section 2.4, and the applicable AMR table number and component name in LRA Section 3.5. If it is not in scope, provide the justification for its exclusion.

The applicant's response to RAI 2.4-8, dated May 19, 2004, is given below:

> LRA Table 2.1-1 identifies electrical portions of electrical and instrumentation and control penetration assemblies (e.g., electrical penetration assembly cables and connections) as an electrical commodity group that serves an intended function. The cable feed-through assemblies are part of the penetration assemblies and are, therefore, in scope for license renewal. As described in LRA Section 2.1.2.3.32, most of the electrical penetration assemblies (including the cable feed-through assemblies) are included in the Environmental Qualification (EQ) Program.
>
> Under the EQ Program, the electrical penetrations, including the cable feed-through assemblies, are subject to replacement based on a qualified life and thus, in accordance with 10 CFR 54.21(a)(1)(ii), are not subject to aging management review.
>
> The non-EQ electrical penetrations are subject to an aging management review. The electrical portions of the non-EQ electrical and I&C penetration assemblies are included in the electrical scoping review. The structural portions of the electrical penetrations providing pressure boundary (essentially leak-tight radiological control barrier) are included in the structural review.
>
> Although the EQ electrical penetrations are not subject to aging management review, all electrical penetrations (EQ and non-EQ) are tested in accordance with the requirements of 10CFR50 Appendix J. The structural components of the electrical penetrations (EQ and non-EQ) were included in the containment and containment internals aging management review as "mechanical and electrical penetrations" listed in LRA Tables 2.4-1 and 3.5.2-1, on pages 2.4-10 and 3.5-25 through 3.5-26.

The staff did not find the applicant's response to RAI 2.4-8 completely acceptable, because it is not clear from the response that the applicant credited Type B local leak rate testing, in accordance with the requirements of Appendix J to 10 CFR Part 50, to manage the leaktightness of the cable feed-through assembly. In a meeting on July 20, 2004, the staff asked the applicant to clarify if it credited Type B local leak rate testing, in accordance with the requirements of Appendix J to 10 CFR Part 50, to manage the leaktightness of the cable feed-through assembly.

The applicant's clarification to its response to RAI 2.4-8, dated July 22, 2004, is given below:

> Leak tightness of electrical penetrations is tested in accordance with the requirements of 10 CFR 50 Appendix J as indicated in LRA table 3.5.2-1. The effects of aging on resilient seals of electrical penetration assemblies are managed by Type B testing performed as required by Appendix J. This includes resilient seals associated with the cable feed through assemblies. Line item 3.5.1-6 of Table 3.5.1 applies to resilient seals associated with cable feed-through assemblies of the electrical penetrations.

Based on its review, the staff finds the applicant's response to RAI 2.4-8 acceptable, because it verifies that the applicant credited Type B local leak rate testing, in accordance with the requirements of Appendix J to 10 CFR Part 50, to manage the leaktightness of the cable feed-through assembly. The staff concludes that the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) to the ANO-2 containment penetrations. Therefore, the staff considers its concern described in RAI 2.4-8 resolved.

2.4.2.3 Conclusion

The staff reviewed the LRA and related structural/component information, including the accompanying scoping boundary drawings (if applicable), to determine if the applicant failed to identify any SSCs that should be within the scope of license renewal. The staff did not find any omissions. In addition, the staff performed an independent assessment to determine whether the applicant failed to identify any components that should be subject to an AMR. The staff did not find any omissions. On the basis of its review, the staff concludes that the applicant has adequately identified the components of the containment and containment internals that are within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the components of the containment and containment internals that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.3 Auxiliary Buildings, Turbine Building, and Yard Structures

In Section 2.4.2 of the LRA, the applicant described the auxiliary buildings, turbine building, and yard structures.

2.4.3.1 Summary of Technical Information in the Application

The ANO-2 auxiliary building is a seismic Category 1 structure. The auxiliary building houses various systems that support operation of ANO-2. It is a conventionally designed, reinforced concrete structure founded on bedrock east of the ANO-2 containment. The auxiliary building consists of a reinforced concrete foundation, reinforced concrete floor slabs, and a tiered reinforced concrete roof with an elastomeric coating or sheet metal roof decking with builtup roofing on rigid insulation. The building is partly above grade (grade is at Elevation 354'-0") and partly below grade. Exterior concrete construction joints contain waterstops at joints below the plant's design flood level.

The auxiliary building contains reinforced masonry block walls that subdivide building areas into separate rooms. They may be seismic Category 1 or 2. Block walls may be fire barriers required for compliance with 10 CFR 50.48. Masonry block walls considered to have a safety function must meet the requirements of NRC IE Bulletin 80-11.

The spent fuel pool's concrete walls are resistant to missiles and are lined with a stainless steel liner plate. The liner plate protects the concrete walls from borated water leakage.

The post-accident sampling system (PASS) building contains seismic Category 2 equipment, but it is designed to seismic Category 1 criteria to avoid potential interaction with safety systems. It is also flood tight.

The turbine building is within the scope of license renewal since it contains fire protection commodities (e.g., fire doors and walls) and electrical cables required for regulated events listed in 10 CFR 54.4(a)(3).

Generally, yard structures within the scope of license renewal are seismic Category 1, and they support and protect seismic Category 1 and 2 equipment. The foundation for the safety-related condensate storage tank, T41B, is a seismic Category 1 structural component on the west side of the ANO-1 containment. The tank is supported on a reinforced concrete mat foundation. Two valve pits are partially underneath and on opposite (north and south) sides of the mat foundation. The south valve pit is for ANO-1 and the north valve pit serves ANO-2. A reinforced concrete wall surrounds the lower portion of the tank to protect against loss from an external missile. The missile wall is integral to the safety-related condensate storage tank foundation mat.

A reinforced concrete pipe trench runs from T41B to the ANO-2 auxiliary building wall. It is surrounded by backfill material and situated on natural soil or backfill material. Figure 3.8-34 of the SAR shows a section through the trench.

The emergency diesel fuel oil storage tank vault is a rigid reinforced concrete box structure on the northwest side of containment. It contains four diesel fuel storage tanks (T57A, T57B, 2T57A, and 2T57B) in separate rooms to protect against fire and flooding. The walls are designed to withstand hydrostatic loading over their full height. The structure has a mat foundation founded on rock. Entry to the vault is through a watertight door. Additionally, a 3-hour fireproof door separates each storage tank room from the others.

The alternate ac generator building is a seismic Category 2 structure north of and adjacent to the north side berm of the bulk fuel oil storage tank (T-25). The building is of steel-framed, precast concrete construction with a steel-framed roof and reinforced concrete slab, founded on grade beams supported by drilled in piers (caissons). This building houses the engine generator set, fuel oil transfer pump, fuel oil day tank, air start system, engine generator control cabinets, HVAC, and fire protection systems.

Seismic Category 1 electrical manholes 2MH01, 2MH02, and 2MH03 are at various locations on the plant site. They are relatively small, reinforced concrete structures founded either on natural soil or backfill materials. Backfill material surrounds these partially underground structures. An access opening in the top slab, at grade level, is provided with a missile-resistant steel or reinforced concrete cover.

The RWT, 2T-3, is on a concrete slab that is part of the auxiliary building. The slab is the roof of the 2T12 tank vault (Room 2020). A small ring wall, filled with oiled sand, placed on the top of the concrete slab separates the tank bottom from the concrete.

The applicant evaluated the following SCs for the auxiliary building, turbine building, and yard structures:

- alternate ac generator building
- auxiliary building sump (except valves and piping)
- building foundations
- concrete beams

- crane rails and crane support structures
- doors (e.g., flood doors and fire doors)
- external penetrations and louvers
- embedded items (including conduit, unistrut, and anchors)
- exterior and interior concrete walls
- floor and roof slabs
- fuel transfer tube support
- HELB barriers such as walls, floors, and doors
- main transformer foundations
- manway hatches (concrete and steel)
- masonry block walls
- miscellaneous structural steel floor framing, columns, bracing, platforms, and catwalks
- new fuel racks
- outside electrical concrete manholes and underground ducts
- outside pipe trenches
- pipe supports, cable trays, conduits, and other equipment supports
- safety-related condensate storage tank (T-41B) foundation and pipe trenches
- RWT (2T-3) foundation
- superstructure framing (over spent fuel pool)
- sump structures excluding piping, equipment, and I&C associated with the sump
- spent fuel pool concrete and liner plate
- spent fuel pool bulkhead gates
- spent fuel crane (L3)
- steel beams
- stairways, platforms, ladders, handrails, gratings, and catwalks
- steel floor framing, columns, and bracing
- tank foundations
- unit auxiliary transformer foundations
- Startup Transformer #3 foundations
- transformer yard concrete firewalls/missile barriers
- transformer bus structural steel supports and foundations
- switchyard startup #3 voltage regulator foundation
- switchyard bus structural steel supports and foundation
- switchyard circuit breaker 1262F03 foundation

The auxiliary building, turbine building, and yard structures have no unique supports. Instead, the bulk commodity review will address the supports.

In Table 2.4-2 of the LRA, the applicant identified the auxiliary building, turbine building, and yard structures component types that are within the scope of license renewal and subject to an AMR, including alternate ac generator building (framing and structural shapes), battery racks, control room extension substructure, EDG stack vent exterior louvers, exhaust stack supports (EDGs and EFW turbine), fuel handling bridge assembly (2H3) crane rails and girders, HELB doors, new fuel racks, spent fuel overhead cranes (L3 and 2L35), spent fuel pool bulkhead gates, spent fuel pool liner (auxiliary building), spent fuel pool superstructure framing (includes associated structural shapes, bars, and plates), switchyard bus structural steel supports, tank 2T12 vault beams, watertight and flood doors, alternate ac generator foundation slab, auxiliary building columns and beams, auxiliary building exterior walls (above grade), auxiliary building exterior walls (below grade), auxiliary building floor slabs, auxiliary building interior load-bearing

walls, auxiliary building foundation mat, auxiliary building sump, seismic Category 1 electrical structures (manholes, walls, slabs, and ductwork), transformer bus structural supports, seismic Category 1 electrical manhole covers, seismic Category 1 masonry block walls, emergency diesel fuel oil storage tank vault (walls, floor slab, and columns), fuel oil storage tank T-25 foundation, PASS building substructure, roof slabs, RWT 2T-3 foundation slab, sodium hydroxide tank 2T10 foundation, spent fuel pool bottom slab and walls, Startup Transformer #3 foundation, Startup Transformer #3 concrete firewalls and missile shield, switchyard bus structural foundation, and switchyard circuit breaker foundation.

2.4.3.2 Staff Evaluation

The staff reviewed LRA Section 2.4.2 and the referenced ANO-2 UFSAR Sections 3.8.4.1.1, 3.8.4.1.5, 3.8.4.1.6, 3.8.4.1.7, 6.2.2.2.1.B, and 8.3.3.2.1. The staff conducted its review in accordance with the guidance described in Section 2.4 of the SRP-LR.

In the performance of the review, the staff evaluated the UFSAR to determine if the applicant failed to identify any structural or component functions of the auxiliary building, turbine building, and yard structures as an intended function, in accordance with the requirements of 10 CFR 54.4(a). The staff did not identify any omissions. The staff then verified that the passive, long-lived components are subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.2 identified an area in which it needed additional information to complete its evaluation of the applicant's scoping and screening results. Therefore, by letter dated April 14, 2004, the staff issued RAI 2.4-4, given below, to the applicant concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1):

> Please clarify the complete scope of liquid storage tanks and tank foundations/supports included in the ANO-2 LR scope. UFSAR Tables 3.6-25, 3.6-26, and 3.6-27 list liquid storage tanks located outside buildings, inside containment, and in the auxiliary building, respectively. It is not clear to the staff (1) whether all the listed Seismic Category I tanks and their foundations/supports are included in the LR scope; and (2) whether any of the Seismic Category II tanks and/or their foundations/supports need to be included in the LR scope due to seismic II/I considerations. Furthermore, the foundations for tanks T-41B and T-25 are identified as structures within the scope of LR in LRA Table 2.2-3, but these tanks are not listed in the UFSAR tables.
>
> Therefore, the applicant is requested to (1) provide a list of all liquid storage tanks and tank foundations/supports included in the LR scope; (2) define the associated intended function(s); (3) provide the technical basis for exclusion of any tanks (and their foundations/supports) that are listed in the UFSAR tables; (4) identify the specific table and row in LRA Section 2.3 or 2.4 that includes each in-scope liquid storage tank and tank foundation/support; and (5) identify the location in LRA Section 3 that contains the AMR for each tank and tank foundation/support.

The applicant's response to RAI 2.4-4, dated May 19, 2004, is given below:

The seismic category I tanks (and their foundations/supports) listed in SAR Table 3.6-25 through Table 3.6-27 are in scope and subject to aging management review. Some Seismic Category II tanks and their foundations are included in the license renewal scope due to seismic II/I considerations and due to other 10CFR54.4(a)(2) considerations. Tanks T-41B and T-25 are addressed in Section 1.2.2.10 of the ANO-2 SAR. Section 9.5.4 of the ANO-2 SAR provides additional information on the T-25 tank. These tanks are not listed in the referenced SAR tables since they are designated as ANO-1 components, which are shared with ANO-2. The following addresses the five requested items:

(1) Even though not all tanks are in the scope of license renewal, all tank foundations in containment and the auxiliary building are in the scope of license renewal. The outside tanks which are in the scope of license renewal also include the foundation as being in scope. Tanks in the auxiliary building that are not subject to aging management review are those that are nonsafety-related and have no potential for failure to prevent accomplishment of a safety function.

(2) As listed in Tables 2.4-2 and 2.4-4, intended functions for tank foundations/supports are support of (a)(1), (a)(2) or (a)(3) equipment. The intended function for tanks is "pressure boundary" as reflected in the various tables listed in Section 2.3 of the LRA.

(3) Tanks in the auxiliary building (Table 3.6-27) that are excluded are those that are nonsafety-related and have no potential for failure to prevent accomplishment of a safety function. Most of the Seismic Category II tanks listed in Table 3.6-27 are in the turbine auxiliary building in areas containing nonsafety-related equipment or are abandoned in place. The waste tanks and the waste condensate tanks are in service and in the auxiliary building and are subject to aging management review. Tank foundations or supports in the auxiliary building and containment are included under the line items "anchors" and "equipment pads" in Table 2.4-4. Seismic category II tanks in SAR Table 3.6-25 are excluded on the technical basis that they do not perform a license renewal intended function. They are neither safety-related nor required for compliance with regulations governing the regulated events. Their failure cannot prevent the satisfactory accomplishment of a required safety function.

(4) As listed under line item "Tank" Table 2.3.2-1, 2.3.2-2, 2.3.3-3, 2.3.3-4, 2.3.3-5, 2.3.3-6, 2.3.3-7, 2.3.3-8, 2.3.3-10, and 2.3.3-11.

As listed in Table 2.4 2 under line item: RWT 2T3 foundation, fuel oil storage tank T-25 foundation, sodium hydroxide tank 2T10 foundation, T41 tank foundation.

Inside tank foundations and supports are included in the LRA as reflected in Table 2.4-4 under "anchors" and "equipment pads."

(5) As shown under the same line item in Tables, 3.2.2-1, 3.2.2-2, 3.3.2-3, 3.3.2-4, 3.3.2-6, 3.3.2-7, 3.3.2-10, 3.3.2-11, 3.4.2-3, 3.5.2-2, and 3.5.2-4.

Based on its review, the staff finds the applicant's response to RAI 2.4-4 acceptable, because the information submitted is sufficient to address the staff's concerns. The applicant has adequately clarified (1) the complete scope of liquid storage tanks and tank foundations/supports included in the ANO-2 license renewal scope, (2) intended functions, (3) the technical basis for exclusion of any tanks (and their foundations/supports) that are listed in the UFSAR tables, (4) the scoping and screening references in LRA Sections 2.3 and 2.4, and (5) the AMR references in LRA Sections 3.2, 3.3, 3.4, and 3.5. The staff concludes that the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1) to the ANO-2 liquid storage tanks and tank foundations/supports. Therefore, the staff considers its concern described in RAI 2.4-4 resolved.

The staff's review of LRA Section 2.4.2 identified a second area in which it needed additional information to complete its evaluation of the applicant's scoping results. Therefore, by letter dated April 14, 2004, the staff issued RAI 2.4-6 (part a), given below, to the applicant concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a):

UFSAR Tables 3.7-12, 3.7-13, and 3.7-14 list concrete block walls that appear to serve intended functions, as defined by 10 CFR 54.4(a). The applicant is requested to (1) verify that all of the listed walls are within the LR scope; (2) if not, then provide the technical basis for any exclusions; (3) identify any additional block walls, not listed in the tables, that are included in the LR scope; and (4) explain the statement "No Access For xx-B-xx" in UFSAR Table 3.7-14 under "Remarks".

The applicant's response to RAI 2.4-6 (part a), dated May 19, 2004, is given below:

(1) The walls listed in SAR Tables 3.7-12, 3.7-13 and 3.7-14 are within the scope of license renewal and subject to aging management review.

(2) There are no exclusions from the above list of block walls.

(3) All seismic category I block walls located within the auxiliary building are included in scope. Also included are 50.48 required block walls located in the turbine building.

(4) "No Access For xx-B-xx" indicates that one side of the wall is in a high radiation area making it inaccessible for routine inspection (e.g., 24-B-29 is the front face of the wall and 24-B-30 is the opposite face).

Based on its review, the staff finds the applicant's response to RAI 2.4- 6 (part a) acceptable, because the information submitted is sufficient to address the staff's concerns. The applicant has (1) verified that all walls listed in UFSAR Tables 3.7-12, 3.7-13, and 3.7-14 are within the scope of license renewal and subject to an AMR, (2) identified that the block walls located in the turbine building and required by 10 CFR 50.48 are also included within the scope of license renewal and subject to an AMR, and (3) adequately explained the statement "No Access for xx-B-xx" in UFSAR Table 3.7-14, under "Remarks." The staff concludes that the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) to the ANO-2 concrete block walls. Therefore, the staff considers its concern described in RAI 2.4- 6 (part a) resolved.

The staff's review of LRA Section 2.4.2 identified a third area in which it needed additional information to complete its evaluation of the applicant's scoping and screening results. Therefore, by letter dated April 14, 2004, the staff issued RAI 2.4-7, given below, to the applicant concerning the specific issues to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1):

> LRA Section 2.4.2 covers the very broad structural category "Auxiliary Building, Turbine Building and Yard Structures". LRA Section 2.4.2 describes the in-scope structures and structural components under both "Description" and "Evaluation Boundaries"; and then refers to LRA Table 2.4-2 for "Components Subject to AMR". The staff cannot clearly define the specific scope of structures and structural components addressed in LRA Section 2.4.2 and cannot correlate which in-scope structures and structural components are subject to AMR. Consequently, the applicant is requested to provide the following additional information:
>
> (a) A complete and concise list of all the structures and structural components that are included in LRA Section 2.4.2.
>
> (b) For each listed structure and structural component, identify the intended function(s).
>
> (c) For each listed structure and structural component, identify whether it is subject to AMR.
>
> (d) If only part or none of the structure or structural component is subject to AMR, then provide the technical basis for the determination.
>
> NOTE: The staff has requested additional information for load handling systems, tank foundations/supports, and concrete block walls in other RAIs. For these items, the applicant may reference the responses to the other RAIs in its response to (b), (c)), and (d) above.

The applicant's response to RAI 2.4-7, dated May 19, 2004, is given below:

(a) The applicant provided a listing of all structures and components that are within the scope of the auxiliary building, turbine building, and yard structures.

(b) The intended functions for the structures and structural components are provided in Tables 2.4-2 and 2.4-4 of the application.

(c) The components subject to an aging management review are summarized in the above table and specifically addressed in Tables 3.5.2-2 and 3.5.2-4.

(d) The turbine building has been included in the scope of license renewal because part of the building contains commodities that are subject to aging management review. These commodities include 10 CFR 50.48 fire walls/floors, missile barriers, and component supports (associated with the station blackout function) which are located in the turbine building at various locations. The remaining portions do not perform an intended function.

Based on its review, the staff concluded that the table presented in part (a) of the applicant's response, which summarizes the structures and structural components included in LRA Section 2.4.2 and identifies the applicable LRA Section 2.4 and 3.5 table entries, provides sufficient information to address parts (a), (b), and (c)) of the RAI. The staff finds the applicant's response to parts (a), (b), and (c)) of the RAI to be acceptable.

However, based on its review, the staff did not find the applicant's response to RAI 2.4- 7, part (d), to be acceptable. It does not address the unit auxiliary transformer foundation and the main transformer foundation. In addition, from the discussion of the turbine building in part (d) of the response, the staff could not determine if the applicant included the entire turbine building within the scope of license renewal, or if the building has been zoned to include only portions that contain commodities that are subject to an AMR. In a meeting on July 20, 2004, the staff requested the applicant to submit the technical basis for concluding that the unit auxiliary transformer foundation and the main transformer foundation are not subject to an AMR, and to clarify its treatment of the turbine building.

The applicant's supplemental response to RAI 2.4-7, part (d), dated July 22, 2004, is given below:

> As noted in the response to RAI 2.5-2 (correspondence dated June 21, 2004 (2CAN060404)), neither the main transformers nor the auxiliary transformer are included in the station blackout recovery path. Neither the main transformers nor the auxiliary transformer perform a safety-related function, affect a safety-related function, or are credited for a regulated event, so they are not subject to aging management review. Thus, their foundations are not subject to aging management review. The turbine building (as a whole) is in the scope of license renewal because it contains commodities that are subject to aging management review.

Based on its review, the staff finds the applicant's supplemental response to RAI 2.4-7, part (d), acceptable because it adequately describes the basis for excluding the unit auxiliary transformer foundation and the main transformer foundation from the scope of license renewal. In addition, it clarifies that the whole turbine building is included within the scope of license renewal. The staff concludes that the applicant has properly applied the scoping criteria of 10 CFR 54.4(a). Therefore, the staff considers its concern described in RAI 2.4-7 resolved.

On March 1 to 5, 2004, the NRC staff performed a scoping and screening inspection at ANO-2. During the inspection, the NRC staff noted that cabling necessary for coping with a station blackout event was supported by the concrete floor slab in the switchyard control house. In accordance with 10 CFR 54.4(a)(3), the applicant had appropriately included the cabling in the scope of license renewal as a system relied on for meeting the NRC's station blackout rule (10 CFR 50.63). However, the applicant did not include the structure on which it was mounted. The staff stated that as the cabling could not perform it's station blackout coping function without adequate support, its structural support system must also be in the scope of license renewal. The applicant agreed to include the entire structure in the scope of license renewal. Subsequent to the inspection, the applicant told the staff that despite this omission, the floor slab was included in a program for managing the effects of aging.

The NRC staff inspection identified an item requiring action by the applicant. The item listed above is identified in the ANO-2 Inspection Report, dated April 19, 2004 (ML0411006481). The applicant indicated that the concrete floor slab was included in an aging management program. The aging management review is discussed in Section 3.5.2.3.2. The final disposition of this item was addressed by the Aging Management Review Inspection Report, dated January 9, 2005.

2.4.3.3 Conclusion

The staff reviewed the LRA and related structural/component information, including the accompanying scoping boundary drawings (if applicable), to determine whether the applicant failed to identify any SSCs that should be within the scope of license renewal. The staff found one omission as indicated above. The staff concludes that the omission was a human error made in implementing the scoping and screening process and not indicative of an inadequate scoping and screening methodology. In addition, the staff performed an independent assessment to determine whether the applicant failed to identify any components that should be subject to an AMR. On the basis of its review, the staff concludes that the applicant has adequately identified the components of the auxiliary building, turbine building, and yard structures that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the components of the auxiliary building, turbine building, and yard structures that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.4 Intake Structure and Emergency Cooling Pond

2.4.4.1 Summary of Technical Information in the Application

In Section 2.4.3 of the LRA, the applicant described the intake structure and emergency cooling pond. The intake structure is in the southeast corner of the plant site. It is a reinforced concrete seismic Category I structure considered an extension of the ANO-1 intake structure.

There is no separation between the two structures, and both are founded on rock. It supports a common gantry crane to service the equipment. The structure can be divided into two major sections. The first section is the portion of the building above grade elevation (Elevation 353'-3").

The remaining section is the pump bay area below grade and partially submerged in water. The intake section of the building has two bays. The back section of the building is a box-type structure that houses the major equipment (e.g., service water pumps and associated equipment). The abovegrade section consists of three predominant elevations—Elevation 354'-0", Elevation 366'-0", and Elevation 378'-0". Missile shield walls are provided at the exterior of the intake structure doorways. Roof plugs above service water pumps function as missile shields and can be removed to provide maintenance access.

The ANO-1 intake structure is integrally connected to the ANO-2 intake structure with a shear key and a row of reinforcing bars near the Elevation 354'-0" slabs. The ANO-1 structure houses the common fire pumps and accessories in the seismic Category 1 portion of the structure.

The intake canal associated with the intake structure provides a suction source for fire water and service water pumps. The canal is approximately 1219 meters (4000 feet) long, with an average depth of 4 meters (14 feet). The normal water elevation is Elevation 338'-0".

The emergency cooling pond is a seismic Category 1, 14-acre, kidney-shaped pond northwest of the plant. Plant discharge (emergency cooling pond inlet) flows into a structure that is surrounded by a 30-meter- (100-foot-) long weir. The emergency cooling pond is excavated in an impervious clay stratum, with the bottom of the pond above bedrock. Riprap placed on the north side of the pond protects the pond side slopes against wave action.

The applicant evaluated the following SSCs for the intake structure and emergency cooling pond:

- structural steel elements, such as floor framing, columns, bracing, platforms, and catwalks
- external penetrations and doors
- bar grates and fish baskets
- building foundations
- concrete beams
- concrete missile barriers
- crane rails and crane support structures
- discharge canal concrete flume
- embedded items (including unistruts and anchors)

- exterior and interior concrete walls
- emergency cooling pond concrete intake
- emergency cooling pond and intake canal
- floor and roof slabs (including portions associated with ANO-1 fire water pump)
- hatches (including ANO-1)
- louvered doors (including ANO-1)
- pipe supports, cable trays, and other equipment supports
- service water screens/filters/strainers
- steel beams
- traveling screens

The intake structure and emergency cooling pond evaluation has no unique supports. Instead, the supports are addressed with the bulk commodities.

In Table 2.4-3 of the LRA, the applicant identified the intake structure and emergency cooling pond component types that are within the scope of license renewal and subject to an AMR, including beams in service water and circulating water bays, floor hatches, louvered doors, support for roof hatches, submerged pump shaft supports, building foundation, columns and beams, emergency cooling pond concrete intake, exterior walls (above grade), exterior walls (below grade), floor slabs, interior walls, roof slab, emergency cooling pond, and intake canal.

2.4.4.2 Staff Evaluation

The staff reviewed LRA Section 2.4.3 and the referenced ANO-2 UFSAR Sections 9.2.5, 3.8.4.1.2, and 3.8.4.1.4. The staff conducted its review in accordance with the guidance described in Section 2.4 of the SRP-LR.

In the performance of the review, the staff evaluated the UFSAR to determine if the applicant failed to identify any structural or component functions of the intake structure and emergency cooling pond as an intended function, in accordance with the requirements of 10 CFR 54.4(a). The staff did not identify any omissions. The staff then verified that the passive, long-lived components are subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

The staff's review of the LRA Section 2.4.3 identified an area in which it needed additional information to complete its evaluation of the applicant's scoping and screening results. Therefore, by letter dated April 14, 2004, the staff issued RAI 2.4-5, given below, to the applicant concerning the specific issue to determine whether the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1):

Based on review of ANO-2 LRA Section 2.4.3, the referenced UFSAR Section 9.2.5, and the ANO-1 LRA, the staff requires additional information before it can conclude that all the necessary elements of the "ultimate heat sink" for ANO-2 have been included in the LR scope.

(a) From LRA Section 2.4.3, it appears that only the water in the emergency cooling pond and the intake canal are needed for safe shutdown of ANO-2. However, for ANO-1, the discharge canal was also included as part of the "ultimate heat sink". The applicant is requested to explain this apparent discrepancy.

(b) UFSAR Section 9.2.5.2.1 and (to a lesser extent) ANO-2 LRA Section 2.4.3 describe various components of the ECP, such as the pipe inlet and outlet structures, the 100 foot long weir, and the ECP spillway. It is not evident to the staff which components described in UFSAR Section 9.2.5.2.1 are essential to the "ultimate heat sink" function and are included within the LR scope. The applicant is requested to (1) identify all components essential to the "ultimate heat sink" function and included in the LR scope; (2) provide the technical basis for exclusion from the LR scope of any components described in UFSAR Section 9.2.5.2.1; (3) identify the specific row in LRA Table 2.4-3 that includes each in-scope component; and (4) identify the location in LRA Section 3 that contains the AMR for each component.

The applicant's response to RAI 2.4-5, dated May 19, 2004, is given below:

(a) The discharge canal is not credited as part of ANO-2's ultimate heat sink. As stated in ANO-2 SAR Section 9.2.1.2.3.7, "Under accident conditions the SWS discharge is automatically changed to the ECP upon the initiation of an SIAS or MSIS." The ANO-1 service water system discharge is not automatically changed to the ECP under accident conditions so the discharge canal is credited as part of the ultimate heat sink for ANO-1.

(b) (1) Structural ECP components essential to the "ultimate heat sink" function and included in the license renewal scope are the pond, the pond inlet and pond outlet structures and the ECP spillway. Associated piping to and from tie points to the service water system is in scope as part of the service water system.

(2) The 225-acre watershed area listed in SAR Section 9.2.5.2.1 is excluded from the license renewal scope since no makeup to the pond is credited after an accident begins.

(3) The specific rows in LRA Table 2.4-3 that address the inlet and outlet structures and the pond are "ECP concrete intake" and "emergency cooling pond". The row labeled "piping" in Table 2.3.3-8 addresses the

piping to and from the ECP. The spillway and 100-foot long weir are included in the line item "emergency cooling pond."

(4) As listed under the same line items in Tables 3.5.2-3 and 3.3.2-8.

Based on its review, the staff finds the applicant's response to RAI 2.4-5 acceptable, because the information submitted is sufficient to address the staff's concern. The response to part (a) of the RAI adequately explains why the discharge canal does not serve an intended function for ANO-2 and is not included within the scope of license renewal for ANO-2. The response to part (b) of the RAI (1) clarifies which components are essential to the ultimate heat sink function and included within the scope of license renewal, (2) provides an adequate technical basis for exclusion of the 225-acre watershed area, (3) identifies the specific rows in LRA Tables 2.4-3 and 2.3.3-8 that include each in-scope component, and (4) identifies the location in LRA Tables 3.5.2-3 and 3.3.2-8 that contain the AMR for each component. The staff concludes that the applicant has properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1) to the ANO-2 ultimate heat sink. Therefore, the staff considers its concern described in RAI 2.4-5 resolved.

2.4.4.3 Conclusion

The staff reviewed the LRA and related structural/component information, including the accompanying scoping boundary drawings (if applicable), to determine whether the applicant failed to identify any SSCs that should be within the scope of license renewal. The staff did not find any omissions. In addition, the staff performed an independent assessment to determine whether the applicant failed to identify any components that should be subject to an AMR. The staff did not find any omissions. On the basis of its review, the staff concludes that the applicant has adequately identified the components of the intake structure and emergency cooling pond that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the components of the intake structure and emergency cooling pond that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.5 Bulk Commodities

2.4.5.1 Summary of Technical Information in the Application

In Section 2.4.4 of the LRA, the applicant described bulk commodities. Structural commodities are structural members that support or protect system components, mechanical piping, electrical lines, and plant equipment. Structural commodities that are unique to a specific structure are evaluated with that structure. Structural commodities which are common to ANO-2 in-scope systems and structures (e.g., anchors, embedments, equipment supports, instrument panels, racks, cable trays, and conduits) are evaluated as bulk commodities.

To support a system component within the scope of license renewal, the structure may transfer dead, live, thermal, vibration, impact, seismic, or wind loads applied to or generated by the affected system component. For a structure to perform a protective function for an in-scope system component, the structure must have sufficient strength and resiliency to ensure that the system component is protected from the effects of design-basis events, such as flood, fire, jet impingement, and missiles.

The SSCs reviewed as bulk commodities include the following:

- anchor bolts
- base plates and embedded unistrut
- battery racks
- cable tray and conduit supports
- cable trays
- component supports
- damming material (fire barrier)
- electrical instrument panels and enclosures
- fire barrier seals
- fire damper framing (in-wall)
- fire doors
- flood curbs
- floor plugs
- hatches
- HVAC duct supports
- instrument line supports
- instrument racks and frames
- joint elastomers at seismic gaps
- lightning protection poles and attachments
- main steamline support structure
- manhole covers
- miscellaneous embedment
- miscellaneous doors, louvers, wire mesh, safety chains, and safety gates
- missile barriers

- monorails, crane rails, and girders
- penetration seals
- pipe sleeves (mechanical/electrical, not penetrating the containment liner plate)
- piping supports (includes whip restraints)
- RCS component support threaded fasteners (for steam generators, RCPs, and pressurizer)
- roofing
- stairs, ladders, handrails, catwalks, platforms, and grating
- support pedestals (pads)
- threaded fasteners
- trisodium phosphate baskets
- waterstops

In Table 2.4-4 of the LRA, the applicant identified the bulk commodities component types that are within the scope of license renewal and subject to an AMR, including base plates, cable tray and conduit supports, embedded unistrut, components supports (e.g., instrument racks and frames), electrical instrument panels and enclosures, fire damper framing, fire doors, fire hose reels, HVAC missile barriers, main steamline support structure, monorails, crane rails and girders, pipe sleeves (not penetrating containment liner plate), piping supports, piping whip restraints, stairs, ladders, platforms, grating (supports), anchor bolts, other threaded fasteners, reactor cavity missile block tie-downs, equipment pads, fireproofing, flood curbs, hatches and plugs, missile shields, support pedestals, equipment hatch seals, fire barrier seals, fire wrap, joint elastomers at seismic gaps, penetration seals, and waterstops.

2.4.5.2 Staff Evaluation

The staff reviewed LRA Section 2.4.4, which does not include any references to the UFSAR for the bulk commodities. The staff conducted its review in accordance with the guidance described in Section 2.4 of the SRP-LR.

In the performance of the review, the staff determined if the applicant failed to identify any structural or component functions of the bulk commodities as an intended function, in accordance with the requirements of 10 CFR 54.4(a). The staff also verified that the passive, long-lived components are subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

The staff's review of the LRA Section 2.4.4 identified several areas in which it needed additional information to complete its evaluation of the applicant's scoping and screening results. Therefore, by letter dated April 14, 2004, the staff issued RAI 2.4-2, given below, to the