2. STRUCTURES AND COMPONENTS SUBJECT TO AN AGING MANAGEMENT REVIEW

This Chapter documents the staff's review of the methodology used by the applicant to develop its integrated plant assessment (IPE) and the results of the IPE. The staff's review of the methodology is presented in Section 2.1 of this SER. The staff's review of the IPE results is presented in Sections 2.2 through 2.5 of this SER.

By letter dated November 29, 2001, Florida power and Light Company submitted its license renewal application (LRA) for St. Lucie Units 1 and 2. As an aid to the staff, the applicant provided license renewal boundary drawings that identified the functional boundaries for systems and components within the scope of license renewal. These boundary drawings are not part of the license renewal application.

The staff issued requests for additional information (RAIs) concerning the applicant's IPE methodology and results in letters dated July 1, 18, and 29, 2002. The applicant responded to these RAIs in letters dated September 26, October 3, November 27, and December 23, 2002.

The staff conducted a scoping and screening methodology audit at the St. Lucie Nuclear Plant on April 15-18, 2002. The focus of the audit was to ensure that the applicant had developed and implemented adequate guidance to conduct the scoping and screening processes in accordance with the methodologies described in the LRA. A copy of the audit report is attached to this SER.

The staff conducted an inspection on October 21-25, 2002, of the results associated with the process of scoping and screening plant structures and components that are subject to aging management reviews. The inspection determined that the documentation of the scoping and screening process was of good quality, detailed, thorough, and understandable. A copy of the inspection report is attached to this SER.

2.1 Scoping and Screening Methodology

2.1.1 Introduction

Title 10 of the *Code of Federal Regulations*, Part 54 (10 CFR Part 54), "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," Section 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 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 describes the scoping and screening methodology used to identify SSCs at St. Lucie, Units 1 and 2, that are within the scope of license renewal, and structures and components (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 St. Lucie, Units 1and 2, LRA, the applicant considered the requirements of the rule, (i.e., 10 CFR Part 54) the statement of consideration for the Rule, and the guidance provided by the Nuclear Energy Institute (NEI) in NEI 95-10, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54—The License Renewal Rule," Revision 3, issued in March 2001. In addition, the applicant also considered the NRC staff's correspondence with NEI and other applicants concerning the development of this methodology.

2.1.2 Summary of Technical Information in the Application

In Sections 2.0 and 3.0 of the LRA, the applicant provides the technical information required by 10 CFR 54.21(a). In Section 2.1, "Scoping and Screening Methodology," of the LRA, the applicant describes 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 Systems," Section 2.4, "Scoping and Screening Results–Structures," and Section 2.5, "Scoping Screening Results–Electrical and Instrumentation and Controls (I&C) Systems," of the LRA amplify the process that the applicant uses to identify the SCs that are subject to an AMR. Chapter 3 of the LRA, "Aging Management Review Results," contains the following information; Section 3.1, "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 Structural Components"; and Section 3.6, "Electrical and Instrumentation and Control." Chapter 4 of the LRA, "Time-Limited Aging Analysis," contains the applicant's evaluation of time-limited aging analyses.

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

In Section 2.1.1.2 of the LRA, the applicant discusses the scoping methodology as it relates to the safety-related criteria, in accordance with 10 CFR 54.4(a)(1). With respect to the safety-related criteria, the applicant states that the SSCs within the scope of license renewal include safety-related SSCs, which are those relied upon to remain functional during and following design-basis events (as defined in 10 CFR 50.49(b)(1)) to ensure the following intended functions:

- 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 that could result in potential offsite exposure comparable to the guidelines in 10 CFR 50.34(a)(1), 10 CFR 50.67(b)(2), or 10 CFR 100.11, as applicable.

Note that the applicant has not revised the current accident source term for St. Lucie, Units 1 and 2, therefore the requirements of 10 CFR 50.67(b)(2) do not currently impact the license renewal program.

The applicant initially relied on the plant component database, which identified the quality list of safety-related and non-safety-related (Q-list) components, to identify safety-related SCs credited with remaining functional during and following design-basis events defined in the current licensing basis. These design basis events (DBEs) encompass design basis accidents, anticipated operational occurrences, natural phenomena, and external events. Additional scoping activities were then performed using two distinct efforts to identify systems and structures within the scope of license renewal. Additional design basis documents, licensing correspondence, and design drawings were reviewed to establish which SSCs were within scope, and to identify which intended functions for each system and structure were within scope.

In Section 2.1.1.3 of the LRA, the applicant discusses the scoping methodology as it relates to the non-safety-related criteria, in accordance with 10 CFR 54.4(a)(2). With respect to the non-safety-related criteria, the applicant states, in part, that a review was performed to identify the non-safety-related SSCs whose failure could prevent satisfactory accomplishment of the safety-related intended functions identified in 10 CFR 54.4(a)(1). The review considered two categories of potential SSCs:

1. non-safety-related SSCs that functionally support the operation of safety-related SSCs.

2. non-safety-related SSCs whose failure could cause an interaction with safety-related SSCs and potentially result in the failure of the safety-related SSCs to perform their intended safety function(s).

For the first category, the applicant conservatively assumed that non-safety-related piping and supports beyond the safety-related/non-safety-related boundary meet the 10 CFR 54.4(a)(2) criterion and are within scope. For the second category, the applicant performed a systematic review of potential non-safety-related/safety-related interactions. These interactions included high-energy pipe breaks, moderate-energy pipe breaks, and interaction of seismically supported non-safety-related systems with safety-related SSCs. As a result of the review, the applicant brought certain design features, such as piping supports, pipe whip restraints, and internal barriers, as well as, certain non-safety-related piping segments and structures, within the scope of license renewal, in accordance with regulatory requirements.

In Section 2.1.1.4 of the LRA, the applicant discusses the scoping methodology as it relates to the regulated event criteria, in accordance with 10 CFR 54.4(a)(3). With respect to the scoping criteria related to 10 CFR 54.4(a)(3), the applicant reviewed all SSCs relied on in safety analyses or plant evaluations to perform an intended function that demonstrates compliance with the Commission's regulations for fire protection (FP) (10 CFR 50.48), environmental qualification (EQ) (10 CFR 50.49), pressurized thermal shock (PTS) (10 CFR 50.61), anticipated transients without scram (ATWS) (10 CFR 50.62), and station blackout (SB0) (10 CFR 50.63) to ensure that they were adequately accounted for in the scoping methodology. To support this review, the applicant assembled and evaluated source documentation developed as part of the applicant's initial response to these specific requirements, including sections from St. Lucie, Units 1 and 2, updated final safety analysis reports (UFSARs), design-basis documents, design drawings (DBDs), component databases, and docketed correspondence, including regulatory commitments to the NRC to address each requirement.

Additionally, the applicant evaluated specific topical source information pertaining to each regulated event, including FP evaluation reports, safe shutdown analyses (SSAs), essential equipment lists, and EQ lists. These source documents contain detailed design information for each regulated event, and provided an additional source of information to identify SCs credited for mitigation of the events of interest. In summary, the SSCs relied on in safety analyses or plant evaluations to perform an intended function that demonstrates compliance with NRC regulations for FP, EQ, PTS, ATWS, and SBO have been included in the scope of license renewal, in accordance with the criteria of 10 CFR 54.4(a)(3).

2.1.2.2 Documentation Sources Used for Scoping and Screening

In Section 2.1.1.1 of the LRA, the applicant describes the relevant technical information sources used to identify the safety-related and non-safety-related intended functions for which the plant has been designed. These sources were also used to develop the list of SSCs subject to an AMR.

The applicant developed a set of DBDs to provide a source of design basis information about selected plant systems. The DBDs are a tool to explain the requirements behind the design, rather than describing the design itself. Twenty-one DBD volumes were developed for each St. Lucie unit. This included DBDs for 20 support and accident mitigation systems, and one DBD on selected licensing issues. The DBDs include the following information of importance to scoping and screening:

- system descriptions,
- references to applicable DBD (such as design changes and calculations) associated with the system
- a list of safety-related system intended functions, intended functions potentially meeting the non-safety-related/safety-related criterion, and intended functions associated with FP, EQ, ATWS, PTS, and SBO.

The PassPort Component Database includes specific component information for SSCs that can be found in the controlled component database. The controlled component database contains as-built information on a component level. The component database consists of multiple data fields for each component, such as design-related information, safety and seismic classifications, and component tag, type, and description.

The piping and instrumentation drawings (P&IDs) are schematic-type drawings that have been created for every significant plant piping system and several ventilation systems. The P&IDs provide valve, damper, piping, ductwork, instrumentation, and other component information. With respect to license renewal scoping, the P&IDs were used to identify seismic Class I boundaries and Quality Group classifications and boundaries, which are delineated on the P&IDs. The seismic and quality group classifications indicated on P&IDs are also described in each unit's UFSAR.

2.1.2.3 Scoping Methodology

The applicant utilized the scoping methodology to identify the plant systems, structures, and components that were within the scope of the license renewal rule. The applicant performed the scoping of SSCs as two separate efforts. A discussion of each effort is presented below.

2.1.2.3.1 Mechanical Systems and Civil Structures Scoping Methodology

The process used by the applicant to identify mechanical systems and civil structures in scope was based on initially establishing evaluation boundaries for each system. For mechanical systems, these evaluation boundaries were determined by mapping the pressure boundary associated with the license renewal system's intended functions onto the system flow diagrams. The system structure and components (SCs) that are within the scope of license renewal (i.e., required to perform a license renewal system intended function) are then identified. For these in scope SCs, component intended functions are then identified. These component intended functions are based on the guidance provided in NEI 95-10.

For civil structures, the evaluation boundaries were determined by a review of design drawings, the structure component list from the component database, and plant walkdowns. SCs that are included within the structure were initially identified. These SCs include items such as walls, supports, and non-current carrying electrical/I&C components, (i.e., conduit, cable trays, electrical enclosures, instrument panels, and related supports). The SCs that are within the scope of license renewal (i.e., required to perform a license renewal system intended function) are then identified. Design features and associated SCs that prevent potential seismic interactions for in-scope structures that house both safety-related and non-safety-related systems are also identified. This was accomplished by performing a walkdown of each plant area containing both safety-related and non-safety-related SSCs. Like the mechanical structures and components, the structural component intended functions for in-scope SCs were identified based on the guidance provided in the Nuclear Energy Institute (NEI) 95-10 report.

2.1.2.3.2 Electrical and I&C Systems Scoping Methodology

The process used by the applicant to identify electrical and I&C systems in scope was based on initially establishing component commodity groups. The applicant stated, in part, that the primary difference in this method versus the one used for mechanical systems and structures is the order in which the component scoping and screening steps are performed. This method was selected for use with the electrical/I&C components since most electrical/I&C components are considered to be active. Thus, the method selected provides the most efficient means for determining electrical/I&C components that require an AMR. The method employed consisted of initially identifying electrical/I&C component commodity groups within the scope of license renewal. This was accomplished by a complete review of design drawings and electrical/I&C component commodity groups in the component database. For each commodity group, both a description and intended functions are identified from a review of pertinent design information.

2.1.2.4 Screening Methodology

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

SSCs that are within the scope of license renewal. The specific screening activities for the various engineering disciplines are further described in Section 2.1.2.1 for mechanical components, Section 2.1.2.2 for civil structures, and Section 2.1.2.3 for electrical/I&C systems of the LRA.

2.1.2.4.1 Mechanical System Screening

The applicant states that the mechanical screening process was implemented on each of the systems that were identified during the scoping review phase to identify the passive mechanical components that support one or more of the system's intended functions. The system's intended functions, in conjunction with component information in the PassPort Component Database, pertinent design information related to the 10 CFR 54.4 (a)(2) and 10 CFR 54.4(a)(3) evaluations, and the applicable system drawings, were used to identify the passive components within the scope of license renewal. The screening criteria applied to this effort included identifying passive components in accordance with 10 CFR 54.21(a)(1)(i), and the guidance in NEI-95-10 and other industry guidance. Specifically, the in-scope SCs that perform an intended function without moving parts, or without a change in configuration or properties (i.e., screening criterion of 10 CFR 54.21(a)(1)(i)), were identified. These active/passive screening determinations were based on the guidance in Appendix B to NEI 95-10. The passive, in-scope SCs that are not subject to replacement, based on a qualified life or specified time period (i.e., screening criterion of 10 CFR 54.21(a)(1)(ii)), were identified as requiring an AMR. The determinations of whether passive, in-scope SCs have a qualified life or specified replacement time period were based on the review of plant-specific information, including the PassPort Component Database, maintenance programs and procedures, vendor manuals, and plant experience. The in-scope SCs identified as requiring an AMR were then compared to NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," to ensure that differences were valid and justified.

Following the completion of the screening review for a system, the passive mechanical components within the scope of license renewal were identified and compiled in a screening results report, which contains pertinent information on the system design, intended functions, components of interest, and relevant aging management evaluation information.

2.1.2.4.2 Civil/Structural Screening

After identifying the SSCs that were within the scope of license renewal, the applicant performed the following screening review to determine which SCs would be subject to an AMR.

The structural components within the scope of 10 CFR Part 54 were reviewed to determine which of the components should be subjected to an AMR, in accordance with 10 CFR 54.21(a)(1). An AMR of a structural component is required if the component performs an intended function without moving parts, or without a change in configuration or properties (i.e., passive), and if it is not subject to replacement on the basis of a qualified life or specified time period (i.e., long-lived).

For the purposes of the LRA screening process, screening was performed for each structure that had been identified as being within the scope of license renewal. The purpose of civil/structural screening was to identify the types of passive structural members (walls, beams,

floors, grating, block walls, missile shields, pads, liners, etc.) that support the intended function(s) of the structure and, therefore, require an AMR. The types of structural members that require an AMR were identified based upon a review of the structural detail drawings and plant walkdowns. For uniquely identified structural members, the data in PassPort Component Database were also reviewed.

The structural screening process was similar to that used for the mechanical systems, and consisted of initially identifying the in-scope SCs that perform an intended function without moving parts, or without a change in configuration or properties (i.e., screening criterion of 10 CFR 54.21(a)(1)(i)). These active/passive screening determinations were based on the guidance in Appendix B to NEI 95-10. The passive, in-scope SCs, which were not subject to replacement based on a qualified life or specified time period (i.e., screening criterion of 10 CFR 54.21(a)(1)(ii)), were identified as requiring an AMR. The determinations of whether passive, in-scope structural SCs have a qualified life or specified replacement time period were based on the review of plant-specific information, including the component database, maintenance programs and procedures, vendor manuals, and plant experience. The applicant also compared the in-scope structural SCs identified as requiring an AMR to the results of the GALL report, and ensured that any differences were validated and justified.

2.1.2.4.3 Electrical and I&C System Screening

After identifying the SSCs that were within the scope of license renewal, the applicant performed the following screening review to determine which electrical components would be subjected to an AMR. As part of this effort, the applicant relied on the requirements contained in 10 CFR 54.21(a)(1)(i), and the industry guidance contained in NEI 95-10, to develop a commodity evaluation approach that relies on a plant-level evaluation of electrical equipment. The majority of electrical/I&C component groups (e.g., transmitters, switches, breakers, relays, actuators, radiation monitors, recorders, isolators, signal conditioners, meters, batteries, analyzers, chargers, motors, regulators, transformers, and fuses) are considered active, in accordance with 10 CFR 54.21(a)(1)(i) and the guidelines in NEI 95-10, and therefore do not require an AMR.

The applicant identified that passive electrical/I&C component commodity groups, which are not subject to replacement based on a qualified life or specified time period (screening criterion of 10 CFR 54.21(a)(1)(ii)), require an AMR. Electrical/I&C component commodity groups covered by the 10 CFR 50.49 Environmental Qualification Program, were considered to be subject to replacement, based on qualified life. Certain passive, long-lived electrical/I&C component commodity groups that do not support license renewal system intended functions were eliminated. The applicant compared the in-scope SCs identified as requiring an AMR to the results of the GALL report to ensure that differences were validated and justified.

2.1.3 Staff Evaluation

As part of the review of the applicant's LRA, the NRC staff evaluated the scoping and screening activities described in the following sections of the application:

- Section 2.1, “Scoping and Screening Methodology,” to ensure that the applicant describes 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), (a)(2), and (a)(3)

- Section 2.2, “Plant Level Scoping Results”

- Section 2.3, “Scoping and Screening Results—Mechanical Systems”

- Section 2.4, “Scoping and Screening Results—Structures”

- Section 2.5, “Screening Results—Electrical and Instrumentation and Controls (I&C) Systems”

In addition, the staff conducted a scoping and screening methodology audit at the St. Lucie site from April 15 to18, 2002. The focus of the audit was to ensure that the applicant had 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 that describe the scoping and screening methodology implemented by the applicant. In addition, the audit team conducted detailed discussions with the cognizant engineers on the I&C of the program, 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 to ensure that the methodology outlined in the administrative controls was appropriately implemented, and the results reports were consistent with the current licensing basis (CLB) as described in the supporting design documentation.

2.1.3.1 Scoping Methodology

The audit team reviewed implementation procedures and engineering reports (outlined below) which describe the scoping and screening methodology implemented by the applicant.

- ENG-QI 5.3, Rev. 4, “License Renewal System/Structure Scoping”
- ENG-QI 5.4, Rev. 3, “License Renewal Screening”
- PSL-ENG-LRSP-00-030, Rev. 2, “License Renewal System/Structure Scoping Report—St. Lucie Unit 1 to Florida Power and Light Company”
- PSL-ENG-LRSP-00-031, Rev. 2, “License Renewal System/Structure Scoping Report—St. Lucie Unit 2—Florida Power and Light Company”
- PSL-ENG-LRSC-00-050, Rev. 2, “License Renewal Screening Results for Structures and Structural Components”
- PSL-ENG-LRSC-00-052, Rev. 1, “License Renewal Screening Results for Electrical/I&C Component Commodity Groups”

The team determined that the scoping and screening methodology reports and procedures were consistent with Section 2.1 of the LRA and were 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 DBDs, system drawings, and

selected licensing documentation, which were relied upon by the applicant 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 was consistent with the CLB of the St. Lucie plants.

As part of the audit, the applicant further described the process used to incorporate plant design information into the LRA development process. The applicant referenced ENG-QI 5.3, Rev. 4, "License Renewal System/Structure Scoping," and ENG-QI 5.4, Rev. 3, "License Renewal Screening," to describe the detailed process for developing the LRA application. To accomplish license renewal scoping, the applicant's engineering instructions incorporated the principle of identifying a traceable record of the scoping by using existing plant documentation to identify systems and structures within the scope of the license renewal rule. Specifically, documentation that the applicant used for the scoping reviews included the UFSAR, Technical Specifications, and documents comprising the St. Lucie CLB. The CLB documents included the DBDs, controlled drawings, and the controlled component list in the PassPort Component Database. The applicant's engineering staff were cognizant of the requirements for and use of these information sources during the scoping development phase of the LRA project.

The applicant provided the audit team with a detailed description of the system DBDs and described how they were incorporated into the scoping and screening process. The DBDs were developed by the applicant during the design configuration documentation project. The audit team reviewed a sample of the DBDs for both safety-related and non-safety-related systems to better understand the approach the applicant implemented to determine which SSCs would be initially placed in scope for license renewal. The team found that the DBDs provide a concise, well-documented discussion of the system, including safety-related, non-safety-related, and NRC-required functions (i.e., functions which had been identified as a result of commitments to the NRC, including those for the NRC regulations identified under 10 CFR 54.4 (a)(3)). Additionally, each DBD identifies any function of the system relied upon for the five regulated events. Included in each DBD was a detailed list of the sources of information, which included St. Lucie specific sources, such as the UFSAR, technical specifications, calculations, and analyses, as well as non-plant-specific sources, such as industry codes and standards, NUREGs, regulatory guides, inspection and enforcement bulletins (IEBs), notices, generic letters, and Commission orders. The DBD documentation is controlled and maintained in accordance with the applicant's Site Quality Assurance Program governed by ENG-QI 3.0, Rev. 4, "Quality Assurance Records." The audit team reviewed the governing procedures and administrative controls and determined that they presented adequate guidance for the preparation, control, and maintenance of the DBDs.

The applicant also provided the audit team with a detailed discussion on the development of the St. Lucie Units 1 and 2 system scoping reports (PSL-ENG-LRSP-00-30, Rev. 2 and PSL-ENG-LRSP-00-31, Rev. 2 respectively). The applicant's engineering staff developed these reports to ensure that SSCs within the CLB, which address the requirements of 10 CFR 54.4(a)(1); 10 CFR 54.4(a)(2); and 10 CFR 54.4(a)(3), were identified and considered for inclusion in the scope of the LRA.

With respect to the information used to scope 10 CFR 54.4(a)(1) safety-related SSCs, the applicant's process described in procedure ENG-QI 5.3, Rev. 4 requires that the DBDs, UFSARs, and the PassPort Component Database system be searched to identify systems and

structures that meet the safety-related criteria. As part of the audit team review of the Q-list implementation, the team reviewed a sample of the database search results tables developed by the applicant to support the LRA program. The applicant designed a series of filters which enabled the LRA review engineers to sort through the equipment data system records and provide concise tables of component records on the basis of safety classification or specific intended functions of interest, such as EQ and FP. The audit team determined that the filter process was a useful tool for the applicant in developing the initial scope of SSCs for the program.

With respect to the scoping of the 10 CFR 54.4(a)(2) SSCs, the applicant developed detailed guidance for evaluating potential non-safety-related SSCs affecting safety-related SSCs. The applicant's scoping procedure provides for two methods of identifying potential 10 CFR 54.4(a)(2) SSCs, a system/structure based approach and a component/spaces approach. The sources of information the applicant used to review and identify these 10 CFR 54.4(a)(2) SSCs included interpretation of guidelines to be considered during the application of the 10 CFR 54.4(a)(2) requirements, description of interactions and events, description of mitigative and support functions, and a summary of potential interactions of certain operational occurrences, such as flooding and high-energy line breaks.

The applicant's 10 CFR 54.4(a)(3) scoping process requires identification of source documents used to provide evaluations for demonstrating compliance with each of the regulated events of interest in accordance with the regulations. The applicant's evaluations focused on identifying and verifying that specific systems or structures were relied upon in response to the particular regulated event. In this evaluation, the applicant identifies the function which is credited or assumed to occur for each of the events. Specific documents that the applicant reviewed for evaluating the regulated events included:

- 10 CFR 50.48 – Fire Protection Evaluation Report, UFSAR, DBDs, and docketed correspondence to regulatory commitments to the NRC that address FP regulations

- 10 CFR 50.49 – Environmental Qualification List, and docketed correspondence to regulatory commitments to the NRC on EQ

- 10 CFR 50.61 – docketed correspondence to regulatory commitments to the NRC that address NRC regulations on PTS and the Reactor Vessel UFSAR section

- 10 CFR 50.62 – docketed correspondence to regulatory commitments to the NRC on ATWS and the UFSAR

- 10 CFR 50.63 – docketed correspondence to regulatory commitments to the NRC on SBO and the UFSAR and DBDs

Following the completion of the identification of the systems or structures included in the scope of license renewal, the applicant listed the system and structure intended functions that were the basis for including the system/structure in the scope. Structures specifically identified using the component/spaces scoping process to satisfy the 10 CFR 54.4(a)(2) requirement were listed by the type of interaction that non-safety-related/safety-related equipment would potentially have in lieu of providing specific intended functions. The audit team reviewed the

completed Unit 1 and Unit 2 scoping results and verified that the applicant had adequately incorporated the results of these efforts into the scoping methodology reports. However, as part of this review, the audit team determined that additional activities were required by the applicant to address the 10 CFR 54.4(a)(2) requirements, as specified in the staff's interim staff guidance on the subject. Additionally, the audit team requested the applicant evaluate the staff's interim staff guidance issued on April 1, 2002, related to the scoping of SSCs to meet the requirements of the SBO rule.

With regard to the scoping of SSCs to meet the requirements of 10 CFR54.4(a)(2), the audit team discussed the current interim staff guidance on the 54.4(a)(2) issue with the applicant. The staff noted that by letters dated December 3, 2001, and March 15, 2002, respectively, the NRC issued a staff position to the NEI which described areas to be considered, and options it expects licensees to use to determine what SSCs meet the 10 CFR 54.4(a)(2) criterion (i.e., non-safety-related SSCs whose failure could prevent satisfactory accomplishment of any safety-related functions identified in paragraphs (a)(1)(i), (ii), and (iii) of 10 CFR 54.4).

The December 3, 2001, letter provided specific examples of operating experience which identified 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 in scope based on the 54.4(a)(2) criterion.

The March 15, 2002, letter further described the staff's expectations for the evaluation of non-piping SSCs to determine which additional non-safety-related SSCs are within scope. The position states that applicants should not consider hypothetical failures, but rather should base their evaluation on the plant's 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 such as significant operating experience reports (SOERs), and engineering evaluations.

Consistent with the staff position described in the aforementioned letters, the audit team requested that the applicant respond to the request for additional information (RAI) 2.1-1 which was sent to the applicant in a letter dated July 1, 2002. In the RAI, the staff specifically asked the applicant to describe its scoping methodology implementation for the evaluation of the 10 CFR 54.4(a)(2) criterion. As part of the response, the staff requested that the applicant indicate the option(s) credited, list the SSCs included within scope, list those SCs for which AMRs were conducted, and for each SC, identify the applicable aging management programs (AMPs) credited for managing the identified aging effects.

By letter dated September 26, 2002 (FPL Letter No. L-2002-139), the applicant responded to the staff's request for information. In that response, the applicant reiterated those SSCs, including mitigative design features, included within the scope of license renewal as a result of its initial evaluation. The following SSCs were initially in scope:

- non-safety-related piping segments and supports at safety-related/non-safety-related functional boundaries which extend beyond the system pressure boundary component

to ensure the integrity of the safety-related/non-safety-related functional system pressure boundary (LRA Tables 3.5-1 through 3.5-16)

- piping/component supports for non-safety-related mechanical systems with the potential of “seismic II over I” interaction with safety-related components (LRA Tables 3.5-1 through 3.5-16)

- non-safety-related conduit, cable trays, supports, and other structural components with the potential of “seismic II over I” interaction with safety-related components (LRA Tables 3.5-1 through 3.5-16)

- design features required to accommodate the effects of flooding, such as curbing, platforms, sumps, sump pumps, and drains (LRA Tables 3.5-1 through 3.5-16, Table 3.3-13, and Table 3.3-16)

- design features required to accommodate the effects of spray, jet impingement, and pipe whip, such as pipe whip restraints and internal barriers (LRA Tables 3.5-1 through 3.5-16)

The applicant further stated that the approach for scoping of "seismic II over I" is dependent upon the location of non-safety-related systems or structures relative to the safety-related systems and structures. As a result, the applicant stated that an area based approach for scoping of “seismic II over I” was chosen. This approach identified the major structures of the plant containing both safety-related and non-safety-related components and structural components. These major structures included containments, component cooling water areas, condensate storage tank enclosures, diesel oil equipment enclosures, emergency diesel generator buildings (EDG), fuel handling buildings, intake structures, reactor auxiliary buildings (RABs), steam trestle areas, turbine building (Unit 1 only), ultimate heat sink dam, and yard structures. Based on the initial identification of these structures, the applicant then established the specific non-safety-related seismic interaction component or structural component types located within the structure for inclusion in the license renewal scope.

The applicant stated that the review for seismic, leakage, pipe rupture, and other interactions of non-safety-related components and structural components that could potentially affect safety-related SCs included both non-safety-related piping systems that are connected to safety-related piping systems, as well as non-safety-related piping systems that are not connected to safety-related piping systems. This review considered the CLB for St. Lucie Units 1 and 2 in establishing seismic, leakage, pipe rupture, and other interactions. Those items determined to have an interaction were included in the scope of license renewal, and AMRs were performed and summarized in the LRA.

The applicant further addressed the staff’s concerns regarding the potential for age-related degradation of non-safety-related SSCs that could affect safety-related SSCs raised during the audit by performing a supplemental review to establish what additional non-safety-related SSCs should be included in the scope of license renewal. This supplemental review included the following six steps:

- A review of industry and plant-specific operating history of non-safety-related piping and components containing air/gas was performed to determine whether these components required further consideration with regard to interactions with safety-related components.

- For each of the major structures of the plant containing both safety-related and non-safety-related components and structural components, non-safety-related piping systems containing fluid and/or steam were identified. This included both high-energy and other piping.

- If the identified non-safety-related piping was in the scope of license renewal to address the other scoping criteria of 10 CFR 54.4(a), no additional evaluation of this piping was required since an AMR has already been performed, and appropriate AMPs, identified to ensure intended functions are maintained. These AMRs and AMPs are included in the LRA.

- All remaining non-safety-related piping from the completion of Steps 1, 2, and 3 above was then assumed to fail anywhere along its length.

- On the basis of the assumed failures from Step 4, and a review of design drawings and plant walkdowns, the effects of pipe whip, jet impingement, physical contact (i.e., piping falling such that it physically contacts safety-related equipment), leakage, and/or spray were evaluated to determine if these interactions could potentially impact safety-related component functions. Specifically, the effects of pipe whip, jet impingement, and physical contact were considered for all non-safety-related high energy piping, and the effects of spray and leakage were considered for all other non-safety-related piping. High energy, as used in this evaluation, includes high energy and moderate energy systems defined by the St. Lucie Units 1 and 2, CLBs, which, encompasses systems operating at conditions of >200 °F or >275 psig. If the effects of these interactions were determined to impact safety-related component functions, the non-safety-related piping and its associated components were identified as being within the scope of license renewal. If there was no impact on safety-related component functions as a result of the effects of these assumed failures, the piping was determined not to meet the scoping criteria of 10 CFR 54.4(a)(2), and thus was not considered to be within the scope of license renewal.

- If the piping and associated components were determined to be within the scope of license renewal, an AMR evaluation was performed on these components, based on AMRs performed on components of the same material exposed to the same internal and external environments.

With respect to the non-fluid-filled piping systems, the applicant performed a review of NRC generic communications and industry operating experience associated with non-safety-related piping/ductwork and components containing air/gas (i.e., heating, ventilation, and air conditioning (HVAC); hydrogen; nitrogen; instrument air; etc.). This review did not reveal any instances of collapse or significant failures of piping/ductwork and components due to aging. Review of plant-specific operating experience associated with non-safety-related piping/ductwork and components containing air/gas also did not identify any instances of

collapses or significant failures of piping/ductwork and components due to aging. As a result, other than the supports for non-safety-related piping/ductwork and components associated with systems containing air/gas, which have already been included in the scope of license renewal in the areas with the potential for interaction with safety-related components, no further SSCs were brought into scope for air/gas systems.

For systems containing fluid and/or steam, each major structure of the plant containing both safety-related and non-safety-related components and structural components was evaluated based on the criteria described in step 5 above. As part of its review of the implementation and results of these activities, the staff performed a license renewal scoping and screening inspection on October 21–25, 2002. The inspectors reviewed the applicant's engineering evaluation, and documentation of the portions of the systems added to scope, selected layout markup drawings, and discussed the process with the cognizant individuals responsible for the evaluations. Additionally, the NRC inspectors performed a walkdown of selected areas of the plant containing SSCs added to scope and areas which were unaffected by the licensee's supplemental review. The inspection team determined that the applicant's implementation of the supplementary evaluation was comprehensive, and the inspectors did not identify any additional equipment which should have been included in scope to meet the 10 CFR 54.4(a)(2) requirement.

The staff has reviewed the applicant's supplemental evaluation and finds it to be acceptable on the basis of the applicant's inclusion of additional non-safety-related SSCs which meet the 10 CFR Part 54.4(a)(2) requirements using the revised methodology. As a result of this supplemental review, the applicant brought portions of additional non-safety-related systems and associated components into the scope of license renewal, supplied the results of the associated AMRs, and presented a summary of the programs and activities that will be used to manage aging of these SCs. The staff's evaluation of the applicant's scoping and screening results and aging management reviews of SCs in these systems is presented in Sections 2.3.5 and 3.3.17.7 of this SER, respectively.

The applicant supplied additional information concerning the (1) expansion of the systems within the scope of license renewal and addition of new portions of systems within scope as a result of the revised methodology, (2) determination of the credible failures which could impact the ability of safety-related SSCs from performing their intended functions, (3) evaluation of relevant operating experience, and (4) incorporation of identified non-safety-related SSCs into the applicant's AMPs, and (5) results of NRC inspection and audit activities. On the basis of this additional information, the staff concludes that the applicant has supplied sufficient information to demonstrate that all SSCs that meet the 10 CFR 54.4(a)(2) scoping requirements have been identified as being within the scope of license renewal. Therefore, RAI item 2.1-1 is considered resolved.

The second scoping issue associated with the scoping of SSCs is related to SBO. The audit team requested that the applicant respond to RAI 2.1-2 that was sent to the applicant in a letter dated July 1, 2002. The RAI requested the applicant to (1) describe the process used to evaluate the SBO portion of the criterion defined in 10 CFR 54.4(a)(3), (2) list those additional SSCs included within scope as a result of its efforts, (3) list those structures and components for which AMRs were conducted, and (4) describe (as applicable for each structure or component) the AMRs that will be credited for managing the identified aging effects.

By letter dated September 26, 2002 (FPL Letter No. L-2002-139), the applicant responded to the staff's request for information. In that response, the applicant stated that the scoping of SSCs to meet the SBO requirements was conducted by performing an evaluation of the design documentation associated with SBO for the units. This design information includes Unit 1 UFSAR Section 15.2.13 and Unit 2 UFSAR Section 15.10, and licensing correspondence between FPL and the NRC to initially resolve the SBO requirements. On the basis of these references, the applicant determined that SBO scoping for the St. Lucie LRA did not identify restoration of offsite power to be relied on or required under the SBO CLB for St. Lucie. Systems relied on for restoration of onsite power, however, were included in the scope of license renewal. In addition to the EDGs, electrical systems identified as within the scope of license renewal for SBO included 480 V electrical, 120/208 V electrical, 120 V vital AC, 125 V DC, 4.16 kV electrical, communications, reactor protection, containment electrical penetrations, safeguards panels, and the data acquisition remote terminal unit.

The applicant contends that it does not rely on the restoration of offsite power to meet the requirements of the SBO rule for St. Lucie, Units 1 and 2. However, the applicant performed a supplemental evaluation to determine the additional electrical and structural components that are in the scope of license renewal for restoration of offsite power. For those electrical and structural components determined to be within the scope of license renewal, the applicant performed AMRs that were included in its response to RAI 2.1-2. The staff's review of the applicant's scoping results and aging management evaluation of SCs related to this issue is presented in Sections 2.5.2.1.1 and 3.6.4 of this SER, respectively.

The applicant provided information concerning the identification of relevant design documentation, including site and industry operating experience, and subsequent expansion of the scope of electrical equipment considered within scope of the license renewal as a result of the revised SBO methodology. On the basis of the additional information supplied by the applicant, the staff finds the applicant's revised methodology to be an acceptable approach for identifying those additional SSCs which should be considered within scope to address the SBO issue. Therefore, RAI item 2.1-2 is considered resolved.

On the basis of the evaluation described above, the audit team determined that the methodology implemented by the applicant, as described in the LRA and supplemental responses to staff's RAIs, is consistent with the requirements of the rule, and that the scoping methodology will identify SCs that meet the screening criteria of 10 CFR 54.4(a)(1-3).

2.1.3.2 Screening Methodology

Evaluation of Methodology for Identifying Structures and Components Subject to an Aging Management Review. The audit team reviewed the methodology used by the applicant to identify mechanical, structural, and electrical components within the scope of license renewal that would be subject to further aging management evaluation. The applicant provided the staff with a detailed discussion of the processes used for each discipline and provided technical reports that described the screening methodology, as well as a sample of the screening results reports for a selected group of safety-related and non-safety-related systems. The applicant referenced ENG-QI 5.4, Rev. 3, "License Renewal Screening," during the review of the screening process. This procedure was used to establish the applicant's screening methodology requirements and to establish requirements for developing screening results

summary reports. These screening results summary reports contain the record of the applicant's screening efforts to meet 10 CFR 54.37(a). The applicant's process followed the guidance provided in NEI 95-10. The applicant utilized two processes to identify those plant SCs that were within the scope of license and that require an AMR. These processes were a systems/structures based approach and a component/spaces based approach.

The applicant's system/structure based approach is used by the applicant when identification of component/structures requiring an AMR is greatly dependent on system intended function. To accomplish this type of screening review the applicant performs the following four evaluations:

- Identify SCs within the system/structure being screened.
- Define system/structure evaluation boundaries and eliminate systems/structures not required to perform the system/structure intended functions.
- Identify SCs that perform their intended functions in a passive manner to eliminate all active SCs.
- Identify long-lived SCs to eliminate all short-lived (replaceable) SCs.

The component/spaces based approach is used by the applicant in cases where a system based review is not conducive to the identification of components/structures requiring an AMR. To accomplish this type of screening review the applicant performs the following four evaluations:

- Define the specific plant design criteria associated with interaction design requirements shall (e.g. equipment interaction envelopes).
- Review plant design documentation to identify specific components/structures for which interaction design analyses or interaction studies have been performed.
- Perform a walkdown of each plant area containing both safety-related and non-safety-related components/structures, as identified in the scoping phase, to identify specific components/structures or categories of components/structures which must meet interaction design requirements.
- Develop a list of components/structures or categories of components/structures requiring an AMR for each applicable plant area.

Mechanical Components. During the audit of the applicant's license renewal scoping and screening process conducted by the NRC staff, the audit team reviewed the methodology used by the applicant to identify and list the 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 implementation of this methodology by reviewing a sample of the mechanical systems identified as being within the scope, the evaluation boundaries drawn within those systems on the P&IDs, the resulting components determined to be within the scope of the rule, the corresponding component-level intended functions, and the resulting list of mechanical components subject to an AMR.

The methodology for identifying mechanical components within the scope of the rule included both uniquely identified (i.e., components identified in the applicant's electronic component database) and nonuniquely identified components. For the uniquely identified components, the individual components were identified and reviewed. For the nonuniquely identified components, the components were categorized by component groups or commodities. These component groups were then evaluated as part of the system screening table development.

The audit team reviewed a sample of the mechanical system screening reports assembled by the applicant, and discussed the process and results with the cognizant engineers who performed the review. The audit team did not identify any discrepancies between the methodology documented and the implementation results.

Structures. During the audit of the applicant's renewal scoping and screening process, the staff also examined the applicant's results from the implementation of this methodology by reviewing the structural components identified as being within the scope, the corresponding structural-level intended functions, and the resulting list of structural components subject to an AMR. This information is detailed in PSL-ENG-LRSC-00-050, Rev. 2, "License Renewal Screening Results Structures and Structural Components".

The applicant used the results of the system scoping process and identified all of the in-scope structures and structural components as the subject of the AMR screening, including buildings, enclosures, equipment pad, foundations, missile shields, structural steel, fire rated assemblies, conduits, cable trays, electrical supports, electrical enclosures, pipe supports, etc. The results of the structure and structural component scoping, documented in PSL-ENG-LRSC-00-050, included a list of 18 in-scope structures, areas buildings, and structural commodity groups. The applicant's screening process was then applied to this set of structures and commodity groups.

The applicant's process for structural component screening involved identifying components listed in the Equipment Data Module for the individual structures. To this, the applicant added additional structural component types which were contained in the structure, but not identified by component number. From this total list, the applicant removed components addressed in other screening documents. The components in this listing were then reviewed to determine which required an AMR.

The audit team reviewed a sample of the structural drawing packages assembled by the applicant, and discussed the process and results with the cognizant engineers who performed the review. The audit team did not identify any discrepancies between the methodology documented and the implementation results.

Electrical Components. During the audit of the applicant's renewal scoping and screening process, the staff also evaluated the implementation of this methodology by reviewing the list of electrical components subject to an AMR described in PSL-ENG-LRSC-00-0052, Rev. 1, "License Renewal Screening Results for Electrical/I&C Component Commodity Groups." To screen these electrical/I&C components, the applicant first started with the results of the system scoping. The applicant then developed a composite list of electrical/I&C commodity group items based on the license renewal lists provided in Appendix B of NEI 95-10, Rev. 3, combined with St. Lucie-specific electrical/I&C components not given in the industry guidance. The St. Lucie-specific items were identified by reviewing St. Lucie-specific electrical and I&C

drawings and a computer search of the applicant's Equipment Data Module of the PassPort Component Database. The applicant next identified the electrical/I&C component commodity group intended functions, screened for active functions of the commodity groups, screened for passive commodity groups, and then defined the commodity groups subject to an AMR. The results were reviewed by the audit team with the cognizant engineers responsible for the review. The audit team did not identify any discrepancies between the methodology documented and the implementation results.

System Screening Results. The applicant implemented a system-level screening process to identify mechanical, structural, and electrical components subject to an AMR. The system screening process included both the uniquely numbered and non uniquely numbered components as stated above for each discipline. The system screening results reports contained the following information:

system description and intended functions (including safety-related and non-safety-related, functions associated with the five regulated events, and other non-license renewal functions)

- system evaluation boundaries (containing boundary components and interfacing system information)

- system screening tables (containing a listing of all components within system and an indication of whether they are within scope, long-lived, and/or passive, and if an AMR is required)

- result table of system components requiring an AMR

These report development activities provided a mechanism to verify that system intended functions, on the basis of detailed system design documentation, were captured adequately, and that the components selected for further review supported those intended functions. The screening tables were further used in the system screening reports to document the individual system components and commodity groups for which AMRs were performed, as well as those components for which no AMR is needed. For each component, the screening table identified the license renewal scoping criteria (i.e., safety-related, non-safety-related affecting safety-related, and the five regulated events) which were used to bring the component into scope.

The audit team reviewed the screening implementation procedures and a selected sample of the system screening reports to ensure consistent application of the applicant's screening methodology. The team identified that the sample reviewed was developed in accordance with the administrative controls governing the process and was consistent in level of detail and presentation. The audit team further reviewed a sample of the license renewal drawing and system screening table results to ensure that the individual components identified in the system screening tables were reflected appropriately on the drawings. The team did not observe any discrepancies between the sample tables and drawings evaluated.

On the basis of the evaluation described above, the audit team determined that the methodology, as described in the LRA and implemented by the applicant, is consistent with the requirements of the rule, and that the screening methodology will identify SCs that meet the screening criteria of 10 CFR 54.21(a)(1).

2.1.4 Conclusions

The staff review of the information presented in Section 2.1 of the LRA, the supporting information in the UFSARs, the information presented during the scoping and screening audit, the scoping inspection, and the applicant's responses to the staff's RAIs, formed the basis of the staff's safety determination. The staff verified that the applicant's scoping and screening methodology, including their supplemental 10 CFR 54.4(a)(2) review which brought additional non-safety-related piping segments and associated components into the scope of license renewal, was consistent with the requirements of the rule and the staff's position on the treatment of non-safety-related SSCs.

The staff concludes that there is reasonable assurance that the applicant's methodology for identifying 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

2.2.1 Introduction

The applicant describes the process for identifying the SSCs within the scope of license renewal in Section 2.1 of the LRA. Using that scoping methodology, the applicant identified the SSCs that are within the scope of license renewal and the systems and structures that are not within the scope of license renewal. The applicant provided the results of its scoping review in Section 2.2 of the LRA, "Plant-Level Scoping Results." The staff reviewed Section 2.2 of the LRA to determine whether there is reasonable assurance that the applicant has appropriately identified all plant-level SSCs that are relied upon to mitigate DBEs as required by 10 CFR 54.4(a)(1), or whose failure could prevent mitigation of DBEs, as required by 10 CFR 54.4(a)(2), as well as the SSCs relied on in safety analyses or plant evaluations to perform a function that is required by one of the regulations referenced in 10 CFR 54.4(a)(3).

2.2.2 Technical Information in the Application

2.2.2.1 Systems, Structures, and Components Within the Scope of License Renewal

The SSCs that the applicant has determined to be within the scope of license renewal are listed in Table 2.2-1, "License Renewal Scoping Results for Mechanical Systems," Table 2.2-2, "License Renewal Scoping Results for Structures," and Table 2.2-3, "License Renewal Scoping Results for Electrical/I&C Systems," of the LRA. The mechanical systems listed in Table 2.2-1 are described in Section 2.3 of the LRA. The structures listed in Table 2.2-2 are described in Section 2.4 of the LRA. The electrical and I&C components listed in Table 2.2-3 are described in Section 2.5. In regard to electrical and I&C systems, the applicant used a commodity group approach for the electrical and I&C components found to be within the scope of license renewal. In response to staff RAIs, the applicant brought into the scope of license renewal two formerly out-of-scope mechanical systems and one formerly out-of-scope structure, and added components for 11 of the mechanical systems already within the scope of license renewal as listed in Table 2.2-1 of the LRA.

Design Differences Between Units 1 and 2

St. Lucie Unit 1 received its operating license March 1, 1976. St. Lucie Unit 2 received its operating license on April 6, 1983. As a result of the 7 year difference in plant age, changes occurred in the plant design and licensing bases which resulted in scoping and screening differences. The most widespread difference, in terms of the number of plant systems impacted, occurs in regards to SBO. Components relied upon for compliance with the SBO rule, 10 CFR 50.63, are specifically identified as being within the scope of the license renewal rule by 10 CFR 54.4(a)(3). St. Lucie Unit 1 is an alternate AC plant which credits a diesel generator from Unit 2. St. Lucie Unit 1 is a DC coping plant. Because of this difference in design approach, SBO support is an intended function for more Unit 1 systems and components than for Unit 2. For example, the Unit 1 turbine cooling water system is within the scope of license renewal because it has an intended function of cooling instrument air components relied upon during an SBO event.

A second major difference is in the area of ventilation system design. The Unit 1 control room air conditioning has three split-system air handling units, whose direct expansion refrigerant loops are housed both indoors and outdoors on the roof of the RAB. The Unit 2 control room air conditioning system is housed completely indoors, and is cooled by the component cooling water system. The Unit 1 computer room and hot shutdown panel are cooled by the miscellaneous ventilation system. This system does not exist at Unit 2; its intended functions are performed by the Unit 2 RAB electrical and battery room ventilation system. The Unit 2 fuel handling building ventilation system is within the scope of license renewal. The Unit 1 fuel handling building ventilation system is not in the scope of license renewal because it is not relied upon to mitigate the consequences of a fuel handling accident (FHA).

St. Lucie Unit 1 has a hydrogen purge system, while Unit 2 has a continuous containment/hydrogen purge system. There are a number of other design differences between the two units, which are discussed in specific section of this safety evaluation report (SER).

2.2.2.2 Systems and Structures Not Within the Scope of License Renewal

The systems and structures that the applicant has determined not to be within the scope of license renewal are also listed in Tables 2.2-1, 2.2-2, and 2.2-3 of the LRA. Including the changes made in response to the staff's RAIs, 24 of the 50 mechanical systems listed in LRA Table 2.2-1, and 21 of the 46 structures listed in LRA Table 2.2-2 do not fall within the scope of license renewal.

2.2.3 Staff Evaluation

The staff reviewed Section 2.2, and specifically Tables 2.2-1, 2.2-2, and 2.2-3 of the LRA, to determine whether there is reasonable assurance that the applicant had appropriately identified plant-level SSCs that are within the scope of license renewal, as required by 10 CFR 54.4. The staff focused its review on verifying that the implementation of the applicant's methodology discussed in Section 2.1 of this SER did not result in the omission of SSCs from the scope of license renewal.

The staff used the UFSARs for St. Lucie, Units 1 and 2, in performing its review. Pursuant to 10 CFR 50.34(b), the UFSARs contain descriptions and analyses of the SSCs of the facility, with emphasis upon performance requirements; the bases, with technical justification, upon which such requirements have been established; and the evaluations required to show that safety functions will be accomplished. The UFSARs are required to be updated periodically pursuant to 10 CFR 50.71(e). Thus, the UFSARs contain updated plant-specific licensing basis information regarding the SSCs and their functions.

The staff sampled the contents of the UFSARs, based on the listing of the systems and structures in Tables 2.2-1 and 2.2-2 of the LRA, to identify whether there are systems and structures that may have intended functions in accordance with the scoping requirements of 10 CFR 54.4, but were listed by the applicant as not within the scope of license renewal.

During its review, the staff determined that additional information was needed to complete its review. By letter dated July 18, 2002, the staff requested, in RAI 2.2-1, that the applicant provide a description of the air blower and sluice water systems. These two systems are listed

in Table 2.2-1 of the LRA as not being within the scope of license renewal, however, descriptions of these systems and the functions they perform were not found in the UFSARs for St. Lucie, Unit 1 or 2. In its response dated October 3, 2002, the applicant stated that both of these systems support the steam generator blowdown treatment facility demineralizer resin transfer process. Furthermore, the applicant stated that neither of these systems perform or support any system intended function that satisfies the scoping criteria of 10 CFR 54.4(a). The staff finds the applicant's response to be acceptable because these systems are not safety-related or credited for any design basis event and are not, therefore, within the scope of license renewal, as defined in 10 CFR 54.4(a).

By letter dated July 29, 2002, the staff requested, in RAI 2.2-2, that the applicant provide the basis for not listing miscellaneous drains as being within the scope of license renewal as presented in Table 2.2-1 of the LRA, although certain drains are credited in the flooding analysis presented in Section 3.6 of the Unit 2 UFSAR. The drains credited in the flooding analysis include the floor drains in the Unit 2 diesel generator building and the Unit 2 component cooling water area. In its response dated October 3, 2002, the applicant stated that the miscellaneous drains referred to in Table 2.2-1 are associated with the extraction steam system which is not within the scope of license renewal, and that most of the floor drains credited by the UFSAR flooding analysis are included in the scope of license renewal as part of the waste management system. The drain components associated with the waste management system are listed in Table 3.3-16 of the LRA. However, the specific floor drains in the Unit 2 diesel generator building and component cooling water areas cited by the RAI are not in the scope of license renewal. The applicant justified this omission by stating that the openings under these building doorways can accommodate the maximum leakage anticipated from piping system failures in the structures. Since the applicant explained that the diesel building and component cooling water area floor drains did not meet the scoping criteria for license renewal, the staff finds the applicant's response to be acceptable.

2.2.4 Conclusion

On the basis of its review of the information presented in Sections 2.2-1 and 2.2-2 of the LRA, the supporting information in the UFSARs for Units 1 and 2, and the information provided in response to RAIs, the staff concludes that there is reasonable assurance that the applicant has identified all SSCs appropriately whose intended functions meet the scoping and screening requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

2.3 System Scoping and Screening Results: Mechanical

This section addresses the staff's review of the results of the scoping and screening methodology for mechanical systems. The mechanical systems consist of the following:

Reactor Coolant Systems

- reactor coolant piping
- pressurizers
- reactor vessels (includes pressure boundary of control element drive mechanisms)
- reactor vessel internals

- reactor coolant pumps
- steam generators

Engineered Safety Feature Systems

- containment cooling
- containment spray
- containment isolation
- safety injection
- containment post-accident monitoring

Auxiliary Systems

- chemical and volume control system
- component cooling water
- demineralized makeup water
- diesel generators and support systems
- emergency cooling canal
- fire protection
- fuel pool cooling
- instrument air
- intake cooling water
- miscellaneous bulk gas system
- primary water makeup
- sampling system
- service water (potable and sanitary water)
- turbine cooling water (Unit 1 only)
- ventilation
- waste management

Steam and Power Conversion Systems

- main steam, auxiliary steam, and turbine
- main feedwater and steam generator blowdown
- auxiliary feedwater and condensate

In accordance with the requirements stated in 10 CFR 54.21(a)(1), the applicant must identify and list structures and components subject to an AMR. These are passive, long-lived structures and components that are within the scope of license renewal. To verify that the applicant properly implemented its methodology, the staff reviewed the scoping and screening results to confirm that there was no omission of mechanical system components that are subject to an AMR.

2.3.1 Reactor Coolant Systems

In Section 2.3.1, “Reactor Coolant Systems,” of the St. Lucie Units 1 and 2, LRA, the applicant described the SSCs of the reactor coolant system (RCS) that are subject to an AMR for license renewal.

As described in the LRA, the RCS consists of the SCs designed to contain and support the nuclear fuel, contain the reactor coolant, and transfer the heat produced in the reactors to the steam and power conversion systems for the production of electricity.

Unless noted otherwise, the RCS for St. Lucie, Units 1 and 2, are the same, with no components common to both units. The RCSs are described in Unit 1 UFSAR Chapters 4 and 5, and Unit 2 UFSAR Chapters 4 and 5. The following components are included in this subsection—

- reactor coolant piping
- pressurizers
- reactor vessels (includes pressure boundary of control element drive mechanisms)
- reactor vessel internals
- reactor coolant pumps
- steam generators

The license renewal flow diagrams listed in Table 2.3-1 of the LRA show the evaluation boundaries for the portions of the RCS that are within the scope of license renewal.

The RCS components subject to AMR include reactor vessels, control element drive mechanisms (pressure boundary only), pressurizers, steam generators, reactor vessel internals, reactor coolant pumps (RCPs) (pressure boundary only), piping, valves (pressure boundary only), and fittings.

Class 1, as used in this application, means the Safety Class 1 definition found in American National Standards Institute (ANSI) Standard N18.2, "Nuclear Safety Criteria for the Design of Stationary Pressurized Water Reactor Plants."

For St. Lucie Unit 1, the design code for reactor coolant piping is found in ANSI B31.7, Code for Nuclear Power Piping, Class 1, February 1, 1968, Draft Edition for Trial Use and Comment. For St. Lucie Unit 2, the design codes for reactor coolant piping are found in the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III, 1971 Edition through Winter 1972 Addenda, for nuclear steam supply system vendor-supplied reactor coolant piping, and the 1971 Edition through Summer 1973 Addenda, for architect-engineer supplied reactor coolant piping. The St. Lucie Units 1 and 2 pressurizer surge lines were reanalyzed in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, 1986 Edition with no Addenda, in response to NRC Bulletin 88-11, "Pressurizer Surge Line Thermal Stratification."

The pressurizers were designed and fabricated in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, 1965 Edition through Winter 1967 Addenda, for St. Lucie Unit 1, and ASME Boiler and Pressure Vessel Code, Section III, 1971 Edition through Summer 1972 Addenda, for St. Lucie Unit 2.

The reactor vessels were manufactured by Combustion Engineering in accordance with the design and fabrication requirements of the ASME Boiler and Pressure Vessel Code, Section III, 1965 Edition through Winter 1967 Addenda, for St. Lucie Unit 1, and the ASME Boiler and Pressure Vessel Code, Section III, 1971 Edition through Summer 1972 Addenda, for St. Lucie

Unit 2. The control element drive mechanisms were designed and fabricated in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, 1968 Edition through Summer 1970 Addenda, for St. Lucie Unit 1, and the ASME Boiler and Pressure Vessel Code, Section III, 1974 Edition through Summer 1975 Addenda, for St. Lucie Unit 2.

The St. Lucie Unit 1 reactor vessel internals were designed before the ASME Boiler and Pressure Vessel Code, Section III, Subsection NG, for Core Support Structures was issued. However, a reanalysis of the core support barrel and the reactor internals without the thermal shield was performed following identification of core support barrel and thermal shield damage in 1983. The Unit 1 core support barrel repairs and thermal shield removal are discussed in Subsection 3.1.4.3.2 of the LRA, "Plant-Specific Operating Experience." The reactor vessel internals component stresses were evaluated during this reanalysis and found to be within the limits of the ASME Boiler and Pressure Vessel Code, Section III, Subsection NG, 1972 Draft Edition. The St. Lucie Unit 2 reactor vessel internals were designed in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Subsection NG, 1974 Edition, with the exception of stamping and a code stress report.

The RCP casings, main flanges, and main flange bolts were designed and fabricated in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, 1965 Edition through Winter 1967 Addenda, for St. Lucie Unit 1, and the ASME Boiler and Pressure Vessel Code, Section III, 1971 Edition through Summer 1973 Addenda, for St. Lucie Unit 2.

The original St. Lucie Unit 1 steam generators were replaced in 1997. The replacement steam generators were designed and fabricated in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, 1986 Edition with no Addenda. The St. Lucie Unit 2 steam generators were designed and fabricated in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, 1971 Edition through Summer 1972 Addenda.

2.3.1.1 Reactor Coolant Piping

2.3.1.1.1 Summary of Technical Information in the Application

Reactor coolant piping consists of piping (including branch connections, safe ends, flow restriction orifices, thermowells, and welds), pressure retaining parts of valves, and bolted closures. Reactor coolant piping is described in the Unit 1 UFSAR, Section 5.5.6, and the Unit 2 UFSAR, Section 5.4.3. Reactor coolant piping is presented in the LRA in two parts, Class 1 piping an Non-Class 1 piping.

Class 1 Piping. Class 1 RCS piping components are within the scope of license renewal. The component intended functions of the in-scope Class 1 components include pressure boundary integrity and throttling. The following Class 1 reactor coolant components require an AMR.

- reactor coolant piping
- pressurizer surge, spray, safety, and relief piping and valves

- reactor coolant pump lower seal heat exchangers and associated piping
- reactor coolant pump seal injection piping
- class 1 flow restriction orifices
- thermowells
- reactor vessel head vent piping, fittings, and valves (pressure boundary only) upstream of the class 1 flow restriction orifices
- vent, drain, and instrumentation lines upstream of class 1 flow restriction orifices

Class 1 portions of ancillary systems attached to the RCS ancillary systems include safety injection, sampling, and chemical and volume control.

Non-Class 1 Piping. Several non-Class 1 RCS piping components are within the scope of license renewal. The component intended functions of the in-scope non-Class 1 components include pressure boundary integrity and throttling. The following non-Class 1 reactor coolant piping components require an AMR:

- instrumentation tubing, fittings, and valves (pressure boundary only) downstream of Class 1 flow restriction orifices
- vent and drain piping, tubing, fittings, and valves (pressure boundary only) downstream of Class 1 flow restriction orifices
- reactor vessel head vent piping, fittings, and valves (pressure boundary only) downstream of the Class 1 flow restriction orifices
- reactor coolant pump controlled bleed-off piping and orifices

[The component/commodity groups, and their intended functions, material, environment, and aging effects requiring management and programs/activities for the reactor coolant piping are listed in Table 3.1-1 of the LRA.] The component/commodity groups which were identified in the table include valves, piping/fittings, safe ends, nozzles, thermowells, restriction orifices, welds, bolting, and tubing/fittings. The intended functions identified were pressure boundary and throttling.

2.3.1.1.2 Staff Evaluation

The staff reviewed this section of the LRA to determine whether there is reasonable assurance that the reactor coolant piping components and supporting structures within the scope of license renewal, and subject to an AMR have been identified in accordance with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1).

As part of the evaluation, the staff determined whether the applicant had properly identified the SSCs within the scope of license renewal and subject to an AMR, pursuant to 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). The staff reviewed the relevant portions of the UFSARs for the

reactor coolant piping, and associated components, and compared the information in the UFSARs with the information in the LRA to identify those portions that the LRA did not identify as being within the scope of license renewal and subject to an AMR. The staff then reviewed the SCs that were identified as not being within the scope of license renewal to verify that—

- these SCs do not have any of the intended functions delineated under 10 CFR 54.4(a)

- for those SCs that have an applicable intended function(s), they either perform this function(s) with moving parts or a change in configuration or properties, or they are subject to replacement based on a qualified life or specified time period, as described in 10 CFR 54.21(a)(1)

The staff also reviewed the UFSARs for any functions delineated under 10 CFR 54.4(a) that were not identified as intended functions in the LRA to verify that the SSCs with such functions will be adequately managed, so that the functions will be maintained consistent with the CLB for the extended period of operation.

On the basis of the information presented in Section 2.3.1.1 of the LRA and the associated sections of the UFSARs, the staff did not identify any omissions by the applicant.

2.3.1.1.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the reactor coolant piping system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.1.2 Pressurizers

2.3.1.2.1 Summary of Technical Information in the Application

The pressurizers are vertical cylindrical vessels containing electric heaters in the lower heads and water spray nozzles in the upper heads. The component intended functions of the pressurizers include pressure boundary integrity and pressurizer structural support. The pressurizers are described in the Unit 1 UFSAR, Section 5.5.2, and the Unit 2 UFSAR, Section 5.4.10.

Piping attached to the pressurizers is Class 1. Since piping with no intervening isolation valves interconnects sources of heat in the RCSs, overpressure protection for the RCSs is provided on the pressurizers. Overpressure protection consists of three spring-loaded ASME Code safety valves and two power-operated relief valves (PORVs) on each pressurizer.

The component/commodity groups and their intended functions, material, environment, and aging effects requiring management and programs/activities for the pressurizers are listed in Table 3.1-1 of the LRA. The component/commodity groups which were identified in the table include shells, upper and lower heads, spray nozzles, surge nozzles, relief and safety valve nozzles, instrument nozzles, heater sleeves, surge nozzle safe ends, spray nozzle safe ends, relief nozzle safe ends, instrument nozzle safe ends, safety valve flanges, manway covers and

bolting, heater sheaths, thermowells, support skirt integral attachments, and support skirt and flange. The intended functions identified were pressure boundary and structural support.

2.3.1.2.2 Staff Evaluation

The staff reviewed this section of the LRA to determine whether there is reasonable assurance that the pressurizers, and associated components and supporting structures, within the scope of license renewal, and subject to an AMR, have been identified in accordance with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1).

As part of the evaluation, the staff determined whether the applicant had properly identified the SSCs within the scope of license renewal and subject to an AMR, pursuant to 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). The staff reviewed the relevant portions of the UFSARs for the pressurizers and associated components, and compared the information in the UFSARs with the information in the LRA to identify those SCs that the LRA did not identify as being within the scope of license renewal and subject to an AMR. The staff then reviewed the SCs that were identified as not being within the scope of license renewal to verify that—

- these SCs do not have any of the intended functions delineated under 10 CFR 54.4(a)

- for those SCs that have an applicable intended function(s), they either perform this function(s) with moving parts or a change in configuration or properties, or they are subject to replacement based on a qualified life or specified time period, as described in 10 CFR 54.21(a)(1)

The staff also reviewed the UFSARs for any functions delineated under 10 CFR 54.4(a) that were not identified as intended functions in the LRA to verify that the SSCs with such functions will be adequately managed, so that the functions will be maintained consistent with the CLB for the extended period of operation.

After completing the initial review, the staff requested the applicant to provide additional information on the pressurizer. The applicant's response to the RAIs, as submitted to NRC by letter dated October 3, 2002, are discussed below.

The UFSARs indicate that Units 1 and 2 are required to be in cold shutdown following some postulated fire events. However, the applicant states on page 3.1-11 of the LRA that the pressurizer spray heads do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and, therefore, are not within the scope of license renewal. In RAI 2.3.1-1, the staff requests that the applicant explain whether the components, which spray water inside the pressurizer to condense steam (auxiliary spray), are relied upon to take the units to cold shutdown following the postulated fire events, and to consider postulated SBO events that require the units to be in cold shutdown.

In Section 15.2.13 of the Unit 1UFSAR and Section 15.10 of the Unit 2 UFSAR, the applicant stated that the CLB does not rely on pressurizer spray for SBO events. However, both UFSARs credit the use of auxiliary spray for RCS pressure control in support of achieving cold shutdown following postulated fire events. Auxiliary spray is provided from the chemical and volume control system via solenoid-operated auxiliary spray valves (see License Renewal

Boundary Drawings 1-CVCS-02 and 2-CVCS-04). If the auxiliary spray valves are not available, the pressurizer PORVs are credited as an alternate means for RCS pressure control.

Since the auxiliary spray function is credited for plant shutdown during certain fire events, the pressurizer components that perform this function (spray nozzles and spray nozzle safe ends) are included in the scope of license renewal as identified in LRA Table 3.1-1 (pages 3.1-46 through 3.1-49). The license renewal intended function for these components is pressure boundary. However, the spray heads, which are attached to the spray nozzles inside the pressurizers, do not perform a pressure boundary function. The function of the pressurizer spray heads is to enhance the efficiency (i.e., RCS pressure control response time) of pressurizer spray during plant transients by atomizing the spray flow, thereby, directly condensing the steam bubble.

Since the Fire Protection 10 CFR Part 50 Appendix R criteria allow up to 72 hours to achieve cold shutdown, this function is not required. It should be recognized that normal pressurizer spray flow is 375 gallon per minute (gpm), whereas auxiliary spray flow with one charging pump is only 44 gpm. Therefore, the effectiveness of the spray head is diminished during its use in auxiliary spray. Failure of the spray head would not prohibit the 120 ^{o}F spray water from entering the pressurizer and cooling the bulk pressurizer liquid volume. As previously mentioned, the flow rate of auxiliary spray utilizing one charging pump is 44 gpm. Assuming the normal liquid level of the pressurizer, the entire pressurizer liquid volume (approximately 6000 gallons) could be replaced in less than 3 hours during a plant cooldown. During a 72-hour period, this volume could be replaced multiple times, if required. This injection of cold water into the pressurizer, in combination with securing the normally energized proportional heaters, will result in significant cooling of the lower pressurizer shell. As a result, the lower pressurizer shell will act as a heat sink and cool the upper portion of the shell by direct conduction, in addition to its heat losses to the containment environment. Condensation of the steam bubbles will occur by heat transfer to the internal walls of the pressurizer and to the liquid surface at the vapor/water interface. Although some temperature stratification of the liquid volume may occur near the surface (i.e., vapor/water interface) as the steam condenses, the introduction of cold water into the top of the pressurizer will provide for mixing as the bulk fluid is drawn out of the bottom of the pressurizer through the surge line. The pressurizer heat losses to ambient during normal power operation are compensated for by the proportional heaters which have a rated capacity of 300 kilowatts (kW). Approximately 50 kW of this capacity is required to make up for ambient heat losses. In 1 hour, these heaters supply approximately 170,000 BTUs of heat energy to maintain pressurizer temperature/pressure. Based on the latent heat of vaporization, the amount of heat energy required (to be removed) to condense the entire 700 cubit foot (cu ft) volume of steam at 653 ^{o}F and 2225 pounds per square inch (psi) is approximately 1.8 million BTUs. This further supports the conclusion that 72 hours provides ample time to reduce pressurizer pressure.

The applicant further stated that although auxiliary spray is credited for achieving plant shutdown during certain fire events, there is an alternative method of achieving cold shutdown without the use of auxiliary spray or PORVs, as described in the Unit 2 UFSAR, Section 9.3.4.3.1.3.4 (page 9.3-32).

The applicant concludes that the pressurizer auxiliary spray heads at St. Lucie Units, 1 and 2 are not relied on to demonstrate compliance with certain postulated fire events, as discussed in

the above paragraphs; therefore, the spray heads are not within the scope of license renewal. The staff finds the applicant's assessment acceptable.

In Section 3.1.2 of the LRA, the applicant stated that pressurizer thermal sleeves do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and, therefore, are not within the scope of license renewal. The applicant further stated that the thermal sleeves are not part of the pressure boundary, but do provide thermal shielding to the surge and spray nozzles of the pressurizer to minimize fatigue for those nozzles, which might otherwise result from thermal cycles. In Section 4.3.1 of the LRA, the applicant identifies fatigue as an aging effect requiring a time-limited aging analysis (TLAA). The staff concludes that since the thermal sleeves were credited in the TLAA for the nozzles (pressure boundary), the nozzles require an aging management program. Operable thermal sleeves are relied upon to allow the nozzles to perform their intended safety functions during the extended period of operation, and, therefore, the thermal sleeves should be within the scope of license renewal, pursuant to 10 CFR 54.4(a)(2). Furthermore, the Westinghouse Owners Group has committed in topical report WCAP-14574-A, "License Renewal Evaluation: Aging Management Evaluation for Pressurizers," and the staff has concurred, that the pressurizer surge nozzle and the spray nozzle thermal sleeves should require an AMR. In RAI 2.3.1-2, the staff requested that the applicant perform an AMR of the subject components, or justify why one is not required.

The applicant responded in a letter dated October 3, 2002, that thermal sleeves are included in the design of the pressurizer surge and spray nozzles and are designed to protect these nozzles from thermal shock. Since the thermal sleeves are not part of the nozzle pressure boundary, their failure would not affect the nozzle's pressure boundary intended function. However, the thermal sleeves are included in the fatigue analyses of the pressurizer surge and spray nozzles, and these analyses have been identified as a TLAA and dispositioned in LRA Subsection 4.3.1. Accordingly, the thermal sleeves are considered to be within the scope of license renewal, pursuant to 10 CFR 54.4(a)(2), and require an AMR.

The pressurizer surge and spray nozzle thermal sleeves are fabricated from Alloy 600 and are exposed to an environment of treated water–primary. The only aging effect requiring evaluation for the thermal sleeves is cracking. Cracking due to stress corrosion, or primary stress corrosion, was determined not to be an aging effect requiring management based on the relatively low stress applied to the thermal sleeves. As mentioned above, cracking due to fatigue has been identified as a TLAA and is addressed analytically in LRA Section 4.3.1. Accordingly, there are no aging effects requiring management for the thermal sleeves.

The applicant further stated that this conclusion is consistent with that included NUREG-1801, "Generic Aging Lessons Learned (GALL) Report." Pressurizer thermal sleeves are included in Chapter IV of the GALL report, Item C2.5.5. As indicated in the GALL report table, the aging effect/mechanism identified for the thermal sleeves is cumulative fatigue damage/fatigue. The GALL report further states that fatigue is a TLAA for the period of extended operation and further refers to NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants," Section 4.3, "Metal Fatigue," for acceptable methods for meeting the requirements of 10 CFR 54.21(c)(1). No additional aging effects are identified in the GALL report for pressurizer thermal sleeves.

Table 3.1-1 of the LRA was revised accordingly, as noted below.

TABLE 3.1-1
REACTOR COOLANT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program Activity
Pressurizers					
Internal Environment					
Surge nozzle thermal sleeves [IV C2.5.5] Spray nozzle thermal sleeves [IV C2.5.5]	Pressure boundary (Note 1)	Alloy 600	Treated water – primary	None	None required

Note 1: The thermal sleeves are not part of the pressure boundary, but do provide thermal shielding to minimize nozzle low cycle thermal fatigue.

The acceptability of the AMR results for the thermal sleeves are discussed in Section 3.1.2.2 of this SER. On the basis of the staff's review of the information presented in Section 2.3.1.2 of the LRA, the supporting information in the UFSARs, and the applicant's response to the RAIs, the staff did not identify any additional omissions by the applicant.

2.3.1.2.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the pressurizer system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.1.3 Reactor Vessels

2.3.1.3.1 Summary of Technical Information in the Application

In Section 5.4 of the Unit 1 UFSAR and Section 5.3 of the Unit 2 UFSAR, the applicant describes the reactor vessels. The reactor vessels consist of cylindrical shells with hemispherical bottom heads and flanged removable upper heads. The component intended functions of the reactor vessels include pressure boundary integrity, reactor vessel internals structural support, reactor vessel structural support, refueling cavity structural support, and flow distribution.

The reactor vessel shells are fabricated from courses of multiple plates joined by axial and circumferential welds. The reactor vessels contain the cores, core support structures, control element assemblies, and other parts directly associated with the cores. Inlet and outlet nozzles

are located at an elevation between the head flanges and the cores. Each removable reactor vessel upper head contains a bolting flange employing studs and nuts. Two metallic O-rings form a pressure tight seal in concentric grooves in the head flange. The O-rings are currently replaced each time the reactor vessel upper head is removed. Therefore, the O-rings are not long-lived and do not require an AMR, in accordance with 10 CFR 54.21(a)(1)(ii).

The control element drive mechanisms are attached to penetrations on the reactor vessel upper heads. In-core flux measuring instruments and heated junction thermocouples enter the upper heads through the in-core instrumentation flanges. The heated junction thermocouples on Unit 1 enter the upper head through two spare part length control element drive mechanism penetrations, instead of through the in-core instrumentation flanges. It should be noted that only the pressure boundary portions of the control element drive mechanisms are included in the scope of license renewal. The active portions of the control element drive mechanisms do not require an AMR in accordance with 10 CFR 54.21(a)(1)(i).

In Table 3.1-1 of the LRA, the applicant lists he component/commodity groups, and their intended functions, material, environment, and aging effects requiring management and programs/activities for the reactor vessels. The component/commodity groups which were identified in the table include closure head domes and flanges; closure studs; nuts; washers; control element drive mechanism nozzle tubes and flanges; control element drive mechanism motor housing/upper pressure housings and lower end fittings; primary inlet and outlet nozzles; primary inlet and outlet nozzle safe ends; nozzle support pads; upper, intermediate, and lower shells; vessel flanges, bottom heads; vent pipes; core stabilizing lugs; core stop lugs; in-core instrumentation nozzle tubes and flange adaptors/upper flanges/seal carrier assemblies; flow baffles; and refueling seal rings. The intended functions identified were pressure boundary, support reactor vessel internals, flow distribution, reactor vessel support, and structural support to refueling cavity.

2.3.1.3.2 Staff Evaluation

The staff reviewed this section of the LRA to determine whether there is reasonable assurance that the applicant has identified the reactor vessels and associated components and supporting structures, within the scope of license renewal and subject to an AMR in accordance with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1).

As part of its evaluation, the staff determined whether the applicant had properly identified the SSCs within the scope of license renewal and subject to an AMR, pursuant to 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). The staff reviewed the relevant portions of the UFSARs for the reactor vessels and associated components, and compared the information in the UFSARs with the information in the LRA to identify those portions that the LRA did not identify as being within the scope of license renewal and subject to an AMR. The staff then reviewed the SCs that were identified as not being within the scope of license renewal to verify that—

- these SCs do not have any of the intended functions delineated under 10 CFR 54.4(a)
- for those SCs that have an applicable intended function(s), they either perform this function(s) with moving parts or a change in configuration or properties, or they are

subject to replacement based on a qualified life or specified time period, as described in 10 CFR 54.21(a)(1)

The staff also reviewed the UFSARs for any functions delineated under 10 CFR 54.4(a) that were not identified as intended functions in the LRA to verify that the SSCs with such functions will be adequately managed, so that the functions will be maintained consistent with the CLB for the extended period of operation.

After completing the initial review, the staff requested the applicant to give additional information on the reactor vessels. The applicant's response to the requests for RAIs, as submitted to NRC by letter dated October 3, 2002, are discussed below.

In Section 3.1.3 of the LRA, the applicant stated that reactor vessel flange leak detection lines do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and, therefore, are not within the scope of license renewal. On the basis of the staff's experience with license renewal, the staff has generally concluded that the inner O-ring, the leakoff lines, and the outer O-ring all support the reactor vessel closure head flange pressure boundary. (See NRC letter dated October 27, 1999, to the Babcock and Wilcox Owner's Group.) In general, the leakoff lines require an AMR. The staff requested the applicant to provide a site-specific technical justification as to why aging management is not required, or perform an AMR of these components. In response, the applicant stated that each leak detection line includes a 3/16-inch diameter orifice in the closure head which would limit any potential RCS leakage to within charging pump capacity in the unlikely event of leakage past the inner O-ring. Since the leak detection lines are non-safety-related, and their potential failure would not prevent satisfactory accomplishment of any safety-related functions, the leak detection lines do not perform or support any license renewal intended functions that meet the scoping criteria of 10 CFR 54.4(a), and thus an AMR is not required. The staff finds the applicant's assessment acceptable.

On the basis of its review of the information presented in Section 2.3.1.3 of the LRA, the supporting information in the UFSARs, and the applicant's response to the RAIs, the staff did not identify any omissions by the applicant.

2.3.1.3.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the reactor vessel system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.1.4 Reactor Vessel Internals

2.3.1.4.1 Summary of Technical Information in the Application

In Section 4.2.2 of the Unit 1 UFSAR and Section 3.9.5 of the Unit 2 UFSAR, the applicant described the reactor vessel. The reactor vessel internals are designed to support, align, and guide the core components, and to support and guide in-core instrumentation. The component intended functions of the reactor vessel internals include core support, flow distribution, I&C element assembly guidance and support, and vessel shielding.

The components of the reactor vessel internals subject to license renewal AMR can be divided into the following six groups for each unit.

- The upper internals assembly resides in the upper section of the core support barrel and is removed as one component during refueling. The functions of this assembly are to align and laterally support the upper end of the fuel assemblies, maintain the control element assembly spacing, hold down the fuel assemblies during operation, prevent fuel assemblies from being lifted out of position during severe accident conditions, protect the control element assemblies from the effect of coolant cross-flow in the upper plenum, and support the in-core instrumentation plate assembly.

- The control element shroud assembly is an integral part of the upper internals assembly. The shrouds extend vertically to provide support, alignment, and spacing for the control element assemblies and in-core instrumentation guide tubes.

- The core support barrel assembly consists of the core support barrel and its upper and lower flanges, the lower internals, and the core shroud. The core support barrel and the lower internals components welded to it are the container and support members for the reactor core. The Unit 1 core support barrel originally had a thermal shield; however, the degraded thermal shield was removed in 1983 without replacement. The related plant-specific reactor vessel internals operating experience is discussed in Subsection 3.1.4.3.2 of the LRA. The Unit 2 reactor vessel internals design does not include a thermal shield.

- The core shroud assembly is located within the core support barrel and below the upper internals assembly. The core shroud assembly is aligned by radial lugs and is attached to the core support plate. The core shroud assembly provides a boundary for the coolant flow and limits the amount of coolant bypass flow. The core shroud assembly also reduces the lateral motion of the fuel assemblies.

- The lower internals assembly is a welded structure consisting of a core support plate with fuel alignment pins, a cylinder, support columns, support beams, and a bottom plate. The lower internals assembly positions and provides axial support for the core. The cylinder guides the main coolant flow and limits the core shroud bypass flow.

- The in-core instrumentation plate assembly supports the instrument guide tubes and in-core thimbles. The in-core instrumentation plate assembly is designed to provide a passageway and guidance for each instrument, as well as provide protection from reactor coolant cross-flow.

In Table 3.1-1 of the LRA, the applicant lists the component/commodity groups and their intended functions, material, environment, and aging effects requiring management and programs/activities. The component/commodity groups which were identified in the table include upper guide structure support plate, fuel alignment plate, guide lugs and inserts, hold down ring, control element assembly extension shaft guides, flow bypass inserts, control element assembly instrument tubes, dual tube control element assembly shrouds, control element assembly shroud base, in-core instrumentation support plate and guide tubes, single tube control element assembly shrouds, core support barrel, patches and expandable plugs,

core shroud assemblies, core support plate, cylinder and bottom plate, core support barrel upper flange and alignment keys, fuel alignment pins, snubber spacer block, lower support structure beam assemblies, core support columns, control element assembly shroud bolts, fuel alignment plate guide lug bolts and insert bolts, core shroud tie-rods, and snubber bolts. The intended functions identified were core support, flow distribution, guide/support instrumentation and control element assemblies, and shield vessel.

2.3.1.4.2 Staff Evaluation

The staff reviewed this section of the LRA to determine whether there is reasonable assurance that the reactor vessel internals, and associated components and supporting structures, within the scope of license renewal, and subject to an AMR, have been identified in accordance with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1).

As part of the evaluation, the staff determined whether the applicant had properly identified the SSCs within the scope of license renewal and subject to an AMR, pursuant to 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). The staff reviewed the relevant portions of the UFSARs for the reactor vessel internals and associated components, and compared the information in the UFSARs with the information in the LRA to identify those portions that the LRA did not identify as being within the scope of license renewal and subject to an AMR. The staff then reviewed the SCs that were identified as not being within the scope of license renewal to verify that—

- these SCs do not have any of the intended functions delineated under 10 CFR 54.4(a)

- for those SCs that have an applicable intended function(s), they either perform this function(s) with moving parts or a change in configuration or properties, or they are subject to replacement based on a qualified life or specified time period, as described in 10 CFR 54.21(a)(1).

The staff also reviewed the UFSARs for any function) delineated under 10 CFR 54.4(a) that were not identified as intended functions in the LRA to verify that the SSCs with such functions will be adequately managed, so that the functions will be maintained, consistent with the CLB for the extended period of operation.

On the basis of the its review of the information presented in Section 2.3.1.4 of the LRA, the supporting information in the UFSARs, and the applicant's response to the RAIs, the staff did not identify find any omissions by the applicant.

2.3.1.4.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the reactor vessel internal system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.1.5 Reactor Coolant Pumps

2.3.1.5.1 Summary of Technical Information in the Application

In Section 5.5.5 of the Unit 1 UFSAR and Section 5.5.1 of the Unit 2 UFSAR, the applicant described the RCPs. Each reactor coolant loop contains two vertically mounted, single bottom suction, horizontal discharge, centrifugal motor-driven pumps. The RCPs provide the motive force for circulating the reactor coolant through the reactor core, primary loop piping, and steam generators. The component intended function of the RCPs is pressure boundary integrity.

The RCPs were manufactured by Byron Jackson. Associated components for the Class 1 RCPs include the pump case, pump cover, and closure bolting. The pump cover assembly includes the lower seal heat exchanger that cools the seal cartridge and thermal barrier, the radial bearing stator, and the upper and lower impeller labyrinth seals.

The seal cartridge consists of four face type mechanical seals; three full-pressure seals mounted in tandem and a fourth low-pressure vapor seal designed to withstand system operating pressure when the pumps are not operating. A controlled bleed-off flow through the seals is used to cool the seals and to equalize the pressure drop across each seal. The RCP seals are not subject to an AMR in accordance with 10 CFR 54.21(a)(1)(ii) for the following reasons—

- Seal leakoff is closely monitored in the control room, and a high leakoff flow is alarmed as an abnormal condition requiring corrective action.

- The RCP seal package and its constituent parts are routinely inspected and parts replaced, as required based on condition, for each RCP.

- Plant operating experience has demonstrated the effectiveness of these activities.

Non-Class 1 piping, instrumentation, and other components attached to the RCPs are addressed in Subsection 2.3.1.1.2 of the LRA. Class 1 reactor coolant piping connected to the pumps, including the welded joints, is discussed in Subsection 2.3.1.1.1 of the LRA. The portions of the RCP rotating elements above the pump coupling, including the electric motor and the flywheel, are not subject to an AMR in accordance with 10 CFR 54.21(a)(1)(i).

The component/commodity groups and their intended functions, material, environment, and aging effects requiring management and programs/activities for the RCPs are listed in Table 3.1-1 of the LRA. The component/commodity groups which were identified in the table include casings and covers, lower seal heat exchanger tubes, and bolting. The intended function identified was pressure boundary.

2.3.1.5.2 Staff Evaluation

The staff reviewed this section of the LRA to determine whether there is reasonable assurance that the RCPs, and associated components and supporting structures, within the scope of license renewal, and subject to an AMR, have been identified in accordance with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1).

As part of the evaluation, the staff determined whether the applicant had properly identified the SSCs within the scope of license renewal and subject to an AMR, pursuant to 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). The staff reviewed the relevant portions of the UFSARs for the RCPs,

and associated components, and compared the information in the UFSARs with the information in the LRA to identify those portions that the LRA did not identify as being within the scope of license renewal and subject to an AMR. The staff then reviewed the SCs that were identified as not being within the scope of license renewal to verify that—

- these SCs do not have any of the intended functions delineated under 10 CFR 54.4(a)

- for those SCs that have an applicable intended function(s), they either perform this function(s) with moving parts or a change in configuration or properties, or they are subject to replacement based on a qualified life or specified time period, as described in 10 CFR 54.21(a)(1).

The staff also reviewed the UFSARs for any functions delineated under 10 CFR 54.4(a) that were not identified as intended functions in the LRA, to verify that the SSCs with such functions will be adequately managed, so that the functions will be maintained consistent with the CLB for the extended period of operation.

On the basis of the staff's review of the information presented in Section 2.3.1.5 of the LRA, the supporting information in the UFSARs, and the applicant's response to the RAIs, the staff did not identify any omissions by the applicant.

2.3.1.5.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the RCP system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.1.6 Steam Generators

2.3.1.6.1 Summary of Technical Information in the Application

In Section 5.5.1 of the Unit 1 UFSAR and Section 5.4.2 of the Unit 2 UFSAR, the applicant descries the steam generators. There are two steam generators installed in each unit, one in each reactor coolant loop. The component intended functions of the steam generators include pressure boundary integrity, heat transfer, flow distribution, structural support, and throttling.

The Unit 1 steam generators were replaced in December of 1997 with Babcock and Wilcox International replacement steam generators of the same form, fit, and function. Although similar in general design concept and capacity, the Unit 1 replacement steam generators utilize materials that have improved resistance to known corrosion issues affecting pressurized-water reactor steam generators. The original Unit 2 steam generators remain in service.

Each steam generator is a vertical shell and tube heat exchanger, where heat transferred from a single-phase fluid at high temperature and pressure (the reactor coolant) on the tube side is used to generate a two-phase (steam-water) mixture at a lower temperature and pressure on the secondary side. The reactor coolant coming from the reactor vessel enters the steam generator through a single nozzle into the primary channel head, flows through the inverted U-tubes, and exits through two nozzles in the primary channel head to the RCPs. The head is

divided into inlet and outlet chambers by a vertical divider plate. The steam-water mixture, generated in the secondary side, flows upward through the moisture separators to the steam outlet nozzle at the top of the vessel, providing essentially dry and saturated steam.

Manways are provided to permit access to both sides of the steam generator primary heads, and to the moisture separating equipment on the secondary side of the steam generators. The secondary side of the steam generators also contains the secondary side tube supports, tube bundle wrapper, feedwater nozzle and distribution system, and moisture separation system.

The component/commodity groups, and their intended functions, material, environment, and aging effects requiring management and programs/activities for the steam generators are listed in Table 3.1-1 of the LRA. The component/commodity groups which were identified in the table include primary heads, stay cylinders, primary manway covers, primary inlet and outlet nozzles, primary inlet and outlet nozzle safe ends, tubesheets, primary instrument nozzles, U-tubes, tube plugs, divider plates, upper and lower shells, transition cones, secondary heads, feedwater nozzles and safe ends, steam outlet nozzle safe ends, Unit 2 steam outlet nozzles, Unit 1 steam outlet nozzles with integral flow orifices, blowdown nozzles, secondary instrument nozzles, secondary manway and handhole closure covers, tube bundle wrappers and wrapper supports, tube support lattice bars, conical skirts, upper vessel clevises, and shear keys and boltings. The intended functions identified were pressure boundary, heat transfer, flow distribution, throttling, and structural support.

2.3.1.6.2 Staff Evaluation

The staff reviewed this section of the LRA to determine whether there is reasonable assurance that the steam generators and associated components and supporting structures, within the scope of license renewal, and subject to an AMR, have been identified in accordance with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1).

As part of the evaluation, the staff determined whether the applicant had properly identified the SSCs within the scope of license renewal and subject to an AMR, pursuant to 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). The staff reviewed the relevant portions of the UFSARs for the steam generators and associated components, and compared the information in the UFSARs with the information in the LRA to identify those portions that the LRA did not identify as being within the scope of license renewal and subject to an AMR. The staff then reviewed the SCs that were identified as not being within the scope of license renewal to verify that—

- these SCs do not have any of the intended functions delineated under 10 CFR 54.4(a)
- for those SCs that have an applicable intended function(s), they either perform this function(s) with moving parts or a change in configuration or properties, or they are subject to replacement based on a qualified life or specified time period, as described in 10 CFR 54.21(a)(1)

The staff also reviewed the UFSARs for any functions delineated under 10 CFR 54.4(a) that were not identified as intended functions in the LRA to verify that the SSCs with such functions will be adequately managed, so that the functions will be maintained consistent with the CLB for the extended period of operation.

On the basis of the staff's review of the information presented in Section 2.3.1.6 of the LRA, and the supporting information in the UFSARs, the staff did not identify any omissions by the applicant.

2.3.1.6.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the steam generator system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.2 Engineered Safety Features Systems

In Section 2.3.2, "Engineered Safety Features Systems," of the LRA, the applicant describes SSCs of the engineered safety features (ESF) systems that are subject to an AMR.

The ESF systems consist of SCs designed to function under accident conditions to minimize the severity of an accident, or to mitigate the consequences of an accident. In the event of a loss-of-coolant accident (LOCA), the ESF systems provide emergency coolant to assure the structural integrity of the core, to maintain the integrity of the containment, and to reduce the concentration of fission products expelled to the containment building atmosphere. Unless noted otherwise, the ESF systems for St. Lucie Units 1 and 2 are the same.

2.3.2.1 Containment Cooling

In Section 2.3.2.1 of the LRA, the applicant identifies the components of the containment cooling system that are within the scope of license renewal and subject to an aging management review. This system is further described in Section 6.2.2.2.2 of the UFSARs for both St. Lucie Units 1 and 2.

2.3.2.1.1 Technical Information in the Application

The containment cooling system provides the intended function of maintaining the containment below its structural design pressure and temperature limits following a design basis event by removing heat. The system is designed to operate after a design basis event to remove heat and reduce the pressure in containment to atmospheric. Heat removed from the containment is transferred to component cooling water. The component cooling water system is discussed in Section 2.3.3.2 of the LRA.

The containment cooling system consists of four fan cooler units, a ducted air distribution system, and associated instrumentation and controls. The four units are located outside the secondary shield wall in four different quadrants of each containment. Each fan cooler consists of two banks of cooling coils, a casing, a fan, and a motor. Each cooling coil bank is made up of coil sections connected to supply and return manifolds of the component cooling water system. In Unit 1, a centrifugal fan is employed in each fan cooler. Fan motors are totally enclosed fan-cooled type with an integrally mounted air-to-water heat exchanger to form an entirely closed cooling system. Cooling water comes from the component cooling water system. Each fan cooler in Unit 2 employs an axial flow fan with a totally enclosed air-over type motor.

In both St. Lucie units, the discharge side of the fan coolers are connected through duct risers to the ring header manifold. An adequate quantity of air outlets are provided around the periphery of the ring header to promote mixing and good distribution of air. Blowout panels are provided on the duct risers to attenuate any high-pressure transmission from inside the secondary shield wall area through the duct. During normal conditions, any three of the four fan coolers are in operation. Each unit is sized to remove one-third of the total normal heat load, or one-fourth of the accident load. The fourth fan cooler is automatically started upon receipt of a safety injection actuation signal.

The containment cooling system is in the scope of license renewal because it contains:

- SCs that are safety-related and are relied upon to remain functional during and following design basis events

- SCs that are a part of the EQ Program

- SCs that are relied upon during certain fire events

On the basis of the intended function previously identified, the applicant compiled a list of component types that are within the scope of license renewal and subject to an aging management review. The list provided in Table 3.2-1 includes the following component types: valves (Unit 1 only); piping/fittings; flexible connections; drip pans and thermowells; ducts; and bolting (mechanical closures). In addition, the following components of the containment fan coolers are subject to an aging management review: fan housings; heat exchanger tubes, fins, headers, and end caps; vent plugs and frame side plates; heat exchanger stubs/flanges; motor heat exchanger tubes, fins, and headers (Unit 1 only); closed cooling water flanges (Unit 2 only). The list of components subject to an aging management review is specific for each unit because of design differences. That is, Unit 1 has a centrifugal fan in each fan cooler, while Unit 2 employs an axial flow fan with a totally enclosed air-over type motor.

Table 3.2-1 of the LRA lists pressure boundary as the intended function for the components of the containment cooling system that are subject to an aging management review, with the exception of the containment fan motor heat exchanger fins. Heat transfer is listed as the intended function for the containment fan motor heat exchanger fins, and as an additional intended function for the containment fan cooler heat exchanger tubes and containment fan cooler motor heat exchanger tubes.

2.3.2.1.2 Staff Evaluation

The staff reviewed Section 2.3.2.1 of the LRA and the associated license renewal boundary drawings to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the containment cooling system that are within the scope of license renewal in accordance with 10 CFR 54.4(a). The staff then reviewed the aging management review results provided in Table 3.2-1 of the LRA to determine whether the applicant adequately identified the components of the containment cooling system that are subject to an aging management review in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the containment cooling system that were not listed in Table 3.2-1 of the LRA to verify that the applicant properly identified the components that meet the above requirements.

The staff also reviewed Section 6.2.2.2.2 of the UFSARs for Units 1 and 2 and did not identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.3.2.1 of the LRA.

During the review, the staff questioned the applicant's omission from the scope of license renewal of certain passive and long-lived components of the containment cooling system which are described in the UFSAR, such as the duct risers and ring header. These components are not specifically listed in Table 3.2-1 of the LRA, or shown as being within the scope of license renewal in the license renewal boundary drawings 1-HVAC-01 and 2-HVAC-02 for Units 1 and 2, respectively. In relation to the previously noted components, these HVAC drawings do not show the containment cooling system in sufficient detail to determine the system boundaries for license renewal. As an example, the notation "to ring header" shown on the downstream side of the fan coolers does not indicate exactly which components are designated as being within the scope of license renewal. By letter dated July 1, 2002, the staff requested that the applicant identify components of the containment cooling system that are within scope and subject to an aging management review by providing additional text description, drawings, and/or references to supplement Section 2.3.2.1 of the LRA (RAI 2.3.2-2).

The applicant responded to this RAI by letter dated October 3, 2002 and stated that duct risers and ring headers are components that perform system intended functions, and are therefore within the scope of license renewal and subject to an aging management review. Although duct risers and ring headers were not listed in Table 3.2-1 of the LRA, they have been included in the component grouping "Ducts."

However, the applicant's response to RAI 2.3.2-2 did not include the requested information or drawings to facilitate the staff's review of the containment cooling system. Therefore, the staff reexamined the UFSARs, the original licensing SERs and supplements, and the IPE and IPEEE reports to determine whether components of the containment cooling system that perform an intended function as defined in 10 CFR 54.4(a) are in the scope of license renewal and subject to an aging management review. On Page 6.2-36 of the Unit 2 UFSAR, the applicant states that "blowout panels are provided on the duct risers between the fan coolers and ring header to attenuate high-pressure transmission from inside the secondary shield wall through the duct." On page 6.2-50 of the Unit 2 UFSAR, similar blowout panels are described as components of the containment cooling system. These components are passive and long-lived, and perform an intended function. However, Table 3.2-1 of the LRA did not explicitly include blowout panels as components within the scope of license renewal and subject to an aging management review. The staff therefore issued a follow-up RAI by letter dated July 18, 2002, that requested the applicant to justify the exclusion of blowout panels from Table 3.2-1 (RAI 2.3.2-4).

The applicant responded to RAI 2.3.2-4 by letter dated October 3, 2002. In its response, the applicant stated that blowout panels are components that perform system intended functions and are therefore within the scope of license renewal and subject to an aging management review. Although blowout panels were not listed in Table 3.2-1 of the LRA, they are included in the component grouping "Ducts."

Similarly, Figure 6.2-46 of the UFSAR for Unit 1 shows drum-type air outlets at numerous locations in the containment cooling system. However, these outlets were not identified in Table 3.2-1 of the LRA nor shown on license renewal boundary drawing 1-HVAC-01. These

components are also passive and long-lived and perform an intended function. By letter dated July 18, 2002, the staff requested the applicant justify why the air outlet components are not listed in Table 3.2-1 as being within the scope of license renewal and subject to an aging management review (RAI 2.3.2-5).

The applicant responded to this RAI by letter dated October 3, 2002, and stated that the drum-type air outlets are within the scope of license renewal and subject to an aging management review. Although the drum-type air outlets were not explicitly listed in Table 3.2-1 of the LRA, they are included in the component grouping "Ducts".

Dampers are shown at numerous locations in the containment cooling system in Figure 6.2-46 of the UFSARs for Units 1 and 2. The housings for these components were neither identified in Table 3.2-1 of the LRA nor shown on license renewal boundary drawings 1-HVAC-01 and 2-HVAC-01. Since these dampers perform an intended function in limiting differential pressure in the ring header and duct risers, and the damper housings are passive and long-lived, the staff considered these housings to be within the scope of license renewal and subject to an aging management review. By letter dated July 18, 2002, the staff requested the applicant justify why the damper housings were not subject to an aging management review (RAI 2.3.2-6).

The applicant responded to this RAI by letter dated October 3, 2002. In its response, the applicant stated that dampers were not listed in Table 3.2-1 of the LRA because they were considered to be active components, and thus, not subject to an aging management review, in accordance with 10CFR 54.21(a)(1)(i) and the guidance of NEI 95-10. However, on the basis of the staff's position on previous license renewal applications and expectations expressed by the staff at meetings, the applicant has revised Table 3.2-1 to include damper housings.

The staff considers the applicant's responses to RAIs 2.3.2-2, 2.3.2-4, 2.3.2-5, and 2.3.2-6 acceptable, on the basis that (1) the applicant has clarified that the components referred to by the RAIs are included in component groupings already listed in Table 3.2-1 of the LRA, and (2) the applicant has included a revised version of Table 3.2-1 that includes damper housings as within the scope of license renewal and subject to an aging management review in accordance with the requirements of 10CFR 54.4(a) and 10CFR 54.21(a)(1), respectively.

The staff's review found that the components of the containment cooling system that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an aging management review in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.2.1.3 Conclusion

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the containment cooling system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.2.2 Containment Spray

In Section 2.3.2.2 of the LRA, the applicant identifies the components of the containment spray system that are within the scope of license renewal and subject to an aging management review. This system is further described in Section 6.2.2.2.1 of the UFSARs for both St. Lucie Units 1 and 2.

2.3.2.2.1 Technical Information in the Application

The containment spray is an ESF with the intended functions of removing sufficient heat to maintain the containment pressure and temperature below its design limits following design basis events and removing fission product iodine from the post-accident containment atmosphere. The containment spray system for each unit consists of two containment spray pumps that take suction from the refueling water tanks and spray borated water from nozzles located near the top of each containment structure. When refueling water tank inventory is exhausted, containment spray pump suction is switched to the containment recirculation sumps and the shutdown cooling heat exchangers are used to remove heat from the recirculated water. The shutdown cooling heat exchangers are scoped and screened with the safety injection system in Section 2.3.2.4.

Chemicals are injected into the containment spray pump suction lines during containment spray operations to control pH and for iodine absorption. Unit 1 has a sodium hydroxide tank that supplies sodium hydroxide through eductors to the suction lines of the containment spray pumps. Unit 2 has hydrazine pumps that inject hydrazine from a hydrazine storage tank into the suction lines of the containment spray pumps. In addition, Unit 2 utilizes solid trisodium phosphate dodecahydrate (TSP) in stainless steel mesh baskets located in the vicinity of the containment recirculation sumps to control post-accident pH. The stainless steel mesh baskets are scoped and screened with civil/structural components in Section 2.4.1.1.

Containment spray is in the scope of license renewal because it contains:

- SCs that are safety-related and are relied upon to remain functional during and following design basis events
- SCs that are non-safety-related whose failure could prevent satisfactory accomplishment of the intended functions of safety-related Scs
- SCs that are a part of the EQ Program
- SCs that are relied upon during certain fire events
- SCs that are relied upon during SBO events

On the basis of the intended functions of the containment spray system, the applicant listed the following containment spray system components types subject to an aging management review in Table 3.2-2 of the LRA: refueling water tanks, sodium hydroxide tank (Unit 1 only), hydrazine tank (Unit 2 only), pumps and valves (pressure boundary only), heat exchangers, eductors, orifices, strainers, thermowells, spray nozzles, vortex breaker (Unit 1 only), rupture discs (Unit 1 only), sight-glasses (Unit 1 only), piping, tubing, fittings and bolting. The list of components

subject to an aging management review is specific for each unit because of design differences. That is, Unit 1 has a sodium hydroxide tank, while Unit 2 has hydrazine pumps and a hydrazine storage tank.

In Table 3.2-2 of the LRA, the applicant further identified the intended functions for containment spray components subject to an aging management review as pressure boundary, heat transfer, vortex prevention, spray, throttling, and filtration.

2.3.2.2.2 Staff Evaluation

The staff reviewed Section 2.3.2.2 of the LRA and the associated license renewal boundary drawings to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the containment spray system that are within the scope of license renewal in accordance with 10 CFR 54.4(a). The staff then reviewed the aging management review results provided in Table 3.2-2 of the LRA to determine whether the applicant appropriately identified the components of the containment spray system that are subject to an aging management review in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the containment spray system that were not listed in Table 3.2-2 to verify, with reasonable assurance, that the applicant properly identified the components that meet the above requirements. The staff also reviewed Section 6.2.2.2.1 of the St. Lucie UFSARs for Units 1 and 2 and did not identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.3.2.2 of the LRA.

During the review, the staff asked the applicant to clarify terminology used in Table 3.2-2 of the LRA. Specifically, the staff asked whether the "NaOH Tank rupture disc (Unit 1 only)" component listed in the internal environment section of Table 3.2-2 on page 3.2-14 is the same as the "rupture disc" component listed in the external environment section of that table on page 3.2-19. In a meeting dated May 15 and 16, 2002 (and documented in a summary dated June 21, 2002), the applicant confirmed that these terms referred to different sides of the same component, and that this component was considered to be within the scope of license renewal and subject to an aging management review. The staff finds the applicant's response acceptable because it clarifies the identification of this component consistent with the general information and descriptions provided in Section 2.3.2.2 of the LRA and the UFSARs for both units concerning the containment spray system.

The staff's review found that the components of the containment spray system that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an aging management review in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.2.2.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the containment spray system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.2.3 Containment Isolation

In Section 2.3.2.3 of the LRA, the applicant identifies the components of the containment isolation system that are within the scope of license renewal and subject to an aging management review. The containment isolation system is further described in Section 6.2.4 of the UFSARs for both St. Lucie Units 1 and 2.

2.3.2.3.1 Technical Information in the Application

The containment isolation system is an ESF with the intended function of providing for the closure or integrity of containment penetrations to prevent leakage of uncontrolled or unmonitored radioactive materials to the environment. Not all fluid-bearing lines penetrating the containment are scoped as part of the containment isolation system: process systems that have system intended functions in addition to the containment isolation function are included in the screening and scoping results described in Section 2.3. In addition, the pressure boundary (metallic) portions of electrical penetrations and miscellaneous/spare mechanical penetrations that are not associated with a process system are included in the civil/structural screening and scoping results described in Section 2.4. The non-metallic and conductor portions of containment electrical penetrations are included in the electrical/I&C scoping and screening results described in Section 2.5. The applicant has stated that all containment penetrations and associated containment isolation valves and components that ensure containment integrity, regardless of where they are described, are subject to an aging management review.

The containment isolation system comprises those portions of the containment purge, hydrogen purge (Unit 1), continuous containment/hydrogen purge (Unit 2), integrated leak rate test, service air and containment vacuum relief that have a containment pressure boundary intended function.

Containment vacuum relief has the additional intended function of protecting the containment vessels from subatmospheric internal pressure conditions created by a containment overcooling event. This system has pneumatically operated butterfly valves installed on the shield building annulus side of the containment penetration that serve as automatic vacuum relief valves as well as containment isolation valves. A separate pressure controller that sense the differential pressure between the containment and the annulus actuates each butterfly valve. Each butterfly valve is provided with an air accumulator enabling the valve to open following a loss of instrument air. However, the air accumulators have been scoped and screened with the components of the instrument air system in Section 2.3.3.8 of the LRA.

The containment purge system is in the scope of license renewal because it contains:

- SCs that are safety-related and are relied upon to remain functional during and following design basis events

- SCs that are a part of the EQ Program

The hydrogen purge system (for Unit 1), the continuous containment/hydrogen purge (for Unit 2), and service air systems are in the scope of license renewal because they contain:

- SCs that are safety-related and are relied upon to remain functional during and following design basis events

- SCs that are non-safety-related whose failure could prevent satisfactory accomplishment of the functions of safety-related Scs

- SCs that are a part of the Environmental Qualification Program

The integrated leak rate test system is in the scope of license renewal because it contains:

- SCs that are safety-related and are relied upon to remain functional during and following design basis events

- SCs that are non-safety-related whose failure could prevent satisfactory accomplishment of the functions of safety-related SCs

The containment vacuum relief system is in the scope of license renewal because it contains:

- SCs that are safety-related and are relied upon to remain functional during and following design basis events

- SCs that are a part of the Environmental Qualification Program

On the basis of the intended functions of the containment isolation system, the applicant listed the following component types in this system as within the scope of license renewal and subject to an aging management review in Table 3.2-3 of the LRA: valves (pressure boundary only), piping, tubing, fittings, debris screens and bolting(mechanical closures). In Table 3.2-3, the applicant identified the intended functions of these component types to be pressure boundary and filtration.

2.3.2.3.2 Staff Evaluation

The staff reviewed Section 2.3.2.3 of the LRA and the associated license renewal boundary drawings to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the containment isolation system that are within the scope of license renewal in accordance with 10 CFR 54.4(a). The staff then reviewed the aging management review results provided in Table 3.2-3 of the LRA to determine whether the applicant appropriately identified the components of the containment isolation system that are subject to an aging management review in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the containment isolation system that were not listed in Table 3.2-3 of the LRA to verify that the applicant properly identified the components that meet the above requirements. The staff also reviewed Section 6.2.4 of the UFSARs for both units and did not identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.3.2.3 of the LRA.

The staff's review found that the components of the containment isolation system that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an aging management review in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.2.3.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the containment isolation system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.2.4 Safety Injection System

2.3.2.4.1 Summary of Technical Information in the Application

In Sections 6.3 of the Unit 1and 2 UFSARs, the applicant described the safety injection (SI) system. In Section 9.3.5 of the Unit 1 UFSAR and Section 5.4.7 of the Unit 2 UFSAR, the applicant described the shutdown cooling and safety injection components required to perform shutdown cooling functions. The SI system includes the safety injection tanks, provides emergency core cooling and reactivity control during and following DBEs. Portions of the SI system are also used for shutdown cooling functions. In addition, some portions of the SI system, including the shutdown cooling heat exchangers, are used in conjunction with the containment spray system to cool the containment. The flow diagrams listed in Table 2.3-2 of the LRA show the evaluation boundaries for the portions of the SI system that are within the scope of license renewal.

The SI system is in the scope of license renewal because it contains the following SCs.

- SCs that are safety-related and are relied upon to remain functional during and following DBEs.
- SCs that are non-safety-related whose failure could prevent satisfactory accomplishment of the safety-related functions.
- SCs that are a part of the EQ Program.
- SCs that are relied upon during certain postulated fire (Units 1 and 2) and SBO events (Unit 2 only).

The component/commodity groups and their intended functions, material, environment, and aging effects requiring management and programs/activities are listed in Table 3.2-4 of the LRA. The component/commodity groups which were identified in the table include safety injection tanks, pumps and valves (pressure boundary only), heat exchangers, orifices, thermowells, piping, tubing, and fittings. The intended functions for SI components subject to an AMR include pressure boundary integrity, heat transfer, and throttling.

2.3.2.4.2 Staff Evaluation

The staff reviewed this section of the LRA to determine whether there is reasonable assurance that the SI system components and supporting structures within the scope of license renewal, and subject to an AMR, have been identified in accordance with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1).

As part of the evaluation, the staff determined whether the applicant had properly identified the SSCs within the scope of license renewal and subject to an AMR, pursuant to 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). The staff reviewed the relevant portions of the UFSARs for the SI system, associated components, and compared the information in the UFSARs with the information in the LRA to identify those portions that the LRA did not identify as being within the scope of license renewal and subject to an AMR. The staff then reviewed the SCs that were identified as not being within the scope of license renewal to verify that—

- these SCs do not have any of the intended functions delineated under 10 CFR 54.4(a)

- for those SCs that have an applicable intended function(s), they either perform this function(s) with moving parts or a change in configuration or properties, or they are subject to replacement based on a qualified life or specified time period, as described in 10 CFR 54.21(a)(1)

The staff also reviewed the UFSARs for any functions delineated under 10 CFR 54.4(a) that were not identified as intended functions in the LRA to verify that the SSCs with such functions will be adequately managed, so that the functions will be maintained consistent with the CLB for the extended period of operation.

After completing the initial review, the staff requested the applicant to give additional information on the SI system. The applicant's response to the RAIs, as submitted to NRC by letter dated October 3, 2002, are discussed below.

During the injection mode for a small break LOCA, a portion of the high-pressure safety injection (HPSI) flow is returned to the refueling water tank (RWT) through the bypass line. A section of the bypass line (1-SI-02, location A7, and 2-SI-02, location B4) near the RWT is non-safety-related, and the LRA shows that it is not within the scope of license renewal. If this piping fails and flow is not returned to the RWT, the inventory of the tank could be prematurely exhausted. For both units, there are orifices in the bypass lines which restrict the maximum bypass flow. The Unit 1 bypass flow is 30 gpm per pump (per Table 6.3-2 of the Unit 1 UFSAR) for operation at rated HPSI flow. No specific bypass flow rate could be identified in the Unit 2 UFSAR. For breaks of sufficiently small size, the bypass flow can continue to leak out for a long period of time, potentially exhausting the supply of coolant from the RWT. The failure of the non-safety-related piping in the bypass line could prevent satisfactory accomplishment of the safety-related intended function of the HPSI system. In RAI 2.3.2-1, the staff requested the applicant to justify why the piping and valve body components in the bypass piping to the RWT are not within the scope of license renewal and subject to an AMR.

In its response, the applicant explained that the non-safety-related SI piping identified in RAI 2.3.2-1 is classified Quality Group D, consistent with the CLB. The function of these lines is to ensure that the minimum required flow for the HPSI pumps is provided during shutoff head conditions, such as periodic ASME Boiler and Pressure Vessel Code pump tests, to preclude hydraulic instability and pump overheating. The orifices installed in these lines limit flow to approximately 30 gpm per pump for both units. For RCS breaks of the size identified in RAI 2.3.2-1, emergency operating procedures require that the units be cooled down to the point that shutdown cooling can be initiated. Within a maximum of 10 hours of the event, shutdown

cooling would be in service. Assuming failure of the HPSI pump recirculation line, a total RWT inventory of 18,000 gallons would be unavailable for use (30 gpm x 60 minutes x 10 hours). The minimum required Technical Specification levels for the Unit 1 and Unit 2 RWTs are 401,800 gallons and 417,100 gallons, respectively. Thus, RWT inventory is more than adequate for the scenario. The Unit 1 UFSAR, Section 6.3.2.2.4, and the Unit 2 UFSAR, Section 6.3.2.2.3 do not credit the recirculation path for anything other than pump minimum flow. Accordingly, this piping does not support or perform any license renewal intended functions that meet the scoping criteria of 10 CFR 54.4(a), and thus an AMR is not required. The staff finds the applicant's assessment, as discussed above, acceptable.

On the basis of the staff's review of the information presented in Section 2.3.2.4 of the LRA, the supporting information in the UFSARs, and the applicant's response to the RAIs, the staff did not identify any omissions by the applicant.

2.3.2.4.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the safety injection system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

The staff, therefore, concludes that there is reasonable assurance that the applicant appropriately identified the safety injection system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.2.5 Containment Post-Accident Monitoring

In Section 2.3.2.5 of the LRA, the applicant identifies the components of the containment post accident monitoring system that are within the scope of license renewal and subject to an AMR. The containment post accident monitoring system includes the containment hydrogen monitoring, post accident sampling (Unit 2 only), and containment atmosphere radiation monitoring subsystems. Each subsystem is described separately in the following UFSAR sections—containment hydrogen monitoring is described in Section 6.2.5.2.3 of the Unit 1 UFSAR, and Section 6.2.5.2.1 of the Unit 2 UFSAR; post accident sampling is described in Section 9.3.6 of the Unit 2 UFSAR, and containment atmosphere radiation monitoring is described in Section 12.2.4.1 of the Unit 1 UFSAR, and Section 12.3.4.2.3.1 of the Unit 2 UFSAR.

2.3.2.5.1 Technical Information in the Application

In Section 2.3.3.5 of the LRA, the applicant describes the containment post accident monitoring system, which includes the containment hydrogen monitoring, post accident sampling (Unit 2 only), and containment atmosphere radiation monitoring subsystems. The containment post accident monitoring system is an ESF with the intended functions of (1) providing an indication of the hydrogen gas concentration in the containment atmosphere following a LOCA, and (2) measuring radioactivity in the containment air. The containment hydrogen monitoring system is used to monitor the level of hydrogen in containment following a LOCA. Components of this system are the sample and return tubing, associated valves, hydrogen analyzer, grab sample cylinder, sample pump, moisture separator, cooler, instruments, calibration gas line,

reagent gas line, and nitrogen purge gas supply. The post accident sampling system consists of a shielded skid-mounted sample station, a remotely located control panel, and a remote dissolved oxygen indicating panel. This system provides a means to obtain and analyze reactor coolant samples and containment building samples. The containment atmosphere radiation monitoring system provides a continuous indication in the control room of the particulate and gaseous radioactivity levels inside the containment.

The containment post accident monitoring system is in the scope of license renewal because it contains SCs that are:

- safety-related and are relied upon to remain functional during and following DBEs.
- non-safety-related whose failure could prevent satisfactory accomplishment of the functions of safety-related SCs.
- part of the EQ Program
- relied upon during certain fire events.
- relied on during SBO events.

The applicant listed the following containment post accident monitoring component types as subject to an AMR in Table 3.2-4 of the LRA—valves (pressure boundary only), sample vessel, flexible hoses, piping, tubing, and fittings. The applicant further identified the intended function for containment post accident monitoring components subject to an AMR as pressure boundary.

2.3.2.5.2 Staff Evaluation

The staff reviewed Section 2.3.2.5 of the LRA and the associated license renewal boundary diagrams to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the containment post accident monitoring system that are within the scope of license renewal in accordance with 10 CFR 54.4(a). The staff then reviewed the AMR results provided in Table 3.2-5 of the LRA to determine whether the applicant appropriately identified the components of the containment post accident monitoring system that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the containment post accident monitoring system that were not listed in Table 3.2-5 to verify, with reasonable assurance, that the applicant properly identified the components that meet the above requirements. The staff also reviewed Sections 6.2.5.2.3 and 12.2.4.1 of the Unit 1 UFSAR, and Sections 6.2.5.2.1, 9.3.6, and 2.3.4.2.3.1 of the Unit 2 UFSAR and did not identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.3.2.5 of the LRA.

During the review, the staff observed that the containment post accident monitoring system beyond the outboard containment isolation valves is not within the scope of license renewal (see license renewal boundary drawings 1-SAMP-02 and 2-SAMP-03 for Units 1 and 2, respectively). These piping runs lead to the containment atmosphere radiation monitors, which provide a continuous indication of particulate and gaseous radioactivity levels inside the

containment. To confirm that the applicant correctly excluded these components, the staff reviewed Section 12.2.4.1 of the Unit 1 UFSAR, and Section 12.3.4.2.3.1 of the Unit 2 UFSAR, and determined that the containment atmosphere radiation monitors provide a continuous indication of particulate and gaseous radioactivity levels inside the containment, which is a non-safety-related process monitoring function. Therefore, the staff concurred with the applicant's exclusion of the portion of the containment post accident monitoring system beyond the containment isolation valves on the basis that these components do not perform an intended function that would place them within the scope of license renewal.

The staff's review found that the components of the containment post accident monitoring system that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.2.5.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the containment post accident monitoring system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.2.6 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the engineered safety features system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.3 Auxiliary Systems

In Section 2.3.3, "Auxiliary Systems," of the LRA, the applicant describes the structures, SSCs of the auxiliary systems that are subject to an AMR.

As described in the LRA, the auxiliary systems are those systems used to support normal and emergency plant operations. The systems provide cooling, ventilation, sampling, and other required functions. Unless noted otherwise, the auxiliary systems for St. Lucie Units 1 and 2 are the same.

2.3.3.1 Chemical and Volume Control System

2.3.3.1.1 Summary of Technical Information in the Application

In Sections 9.3.4 of the Units 1 and 2 USFARs, the applicant described the chemical and volume control system (CVCS). The CVCS provides a continuous feed and bleed for the RCS to maintain proper water level and to adjust boron concentration. The CVCS consists of a charging subsystem, a letdown subsystem, and a boric acid makeup subsystem.

The flow diagrams listed in Table 2.3-3 of the LRA show the evaluation boundaries for the portions of the CVCS that are within the scope of license renewal. Insulation is not within the scope of license renewal for the CVCS because the system does not contain boric acid

solutions at concentrations that require heat tracing, tank heaters, and/or insulation to prevent precipitation.

The CVCS is in the scope of license renewal because it contains SCs that are:

- safety-related and are relied upon to remain functional during and following DBEs.
- non-safety related whose failure could prevent satisfactory accomplishment of the safety-related functions.
- part of the EQ Program
- relied on during postulated fires and SBO events.

In Table 3.3-1 of the LRA, the applicant lists the component/commodity groups and their intended functions, material, environment, and aging effects requiring management, and programs/activities. The component/commodity groups which were identified in the table include pumps and valves (pressure boundary only), housings, tanks, heat exchangers, strainers, orifices, thermowells, piping, tubing, and fittings. The intended functions for the CVCS components subject to an AMR include pressure boundary integrity, filtration, and throttling.

2.3.3.1.2 Staff Evaluation

The staff reviewed this section of the LRA to determine whether there is reasonable assurance that the CVCS components and supporting structures within the scope of license renewal, and subject to an AMR, have been identified in accordance with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1).

As part of the evaluation, the staff determined whether the applicant had properly identified the SSCs within the scope of license renewal and subject to an AMR, pursuant to 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). The staff reviewed the relevant portions of the UFSARs for the CVCS and associated components, and compared the information in the UFSARs with the information in the LRA to identify those portions that the LRA did not identify as being within the scope of license renewal and subject to an AMR. The staff then reviewed the SCs that were identified as not being within the scope of license renewal to verify that—

- these SCs do not have any of the intended functions delineated under 10 CFR 54.4(a)
- for those SCs that have an applicable intended function(s), they either perform this function(s) with moving parts or a change in configuration or properties, or they are subject to replacement based on a qualified life or specified time period, as described in 10 CFR 54.21(a)(1)

The staff also reviewed the UFSAR for any function(s) delineated under 10 CFR 54.4(a) that were not identified as intended function(s) in the LRA, to verify that the SSCs with such function(s) will be adequately managed, so that the function(s) will be maintained consistent with the CLB for the extended period of operation.

On the basis of the staff's review of the information presented in Section 2.3.3.1 of the LRA, the supporting information in the UFSARs, and the applicant's response to the RAIs, the staff did not identify any omissions by the applicant.

2.3.3.1.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the CVCS components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.3.2 Component Cooling Water

In Section 2.3.3.2 of the LRA, the applicant identifies the components of the component cooling water system that are within the scope of license renewal and subject to an AMR. This system is further described in Section 9.2.2 of the Units 1 and 2 UFSARs.

2.3.3.2.1 Technical Information in the Application

The component cooling water system is an auxiliary system whose intended function is to remove heat from safety-related and non-safety-related components during normal and emergency operation. In addition, the component cooling water system provides an intermediate radiological barrier between the reactor coolant and the intake cooling water systems and a heat sink for safety-related components associated with reactor decay heat removal for safe shutdown or LOCA conditions. The component cooling water pumps circulate component cooling water through heat exchangers and coolers that are associated with other systems to transfer heat from those systems to component cooling water. The component cooling water heat exchangers transfer heat from component cooling water to intake cooling water. The applicant considers the other coolers and heat exchangers cooled by the component cooling water system to be part of their respective systems and scoped and screened these coolers and heat exchangers associated with those systems.

The component cooling water system is in the scope of license renewal because it contains structures or components that are:

- safety-related and are relied upon to remain functional during and following DBEs.
- non-safety-related whose failure could prevent satisfactory accomplishment of the intended functions of safety-related SCs.
- part of the EQ Program
- relied on during fire events

In LRA Table 3.3-2 of the LRA, the applicant listed the following component types present in the component cooling water system that are subject to an AMR—pumps and valves (pressure boundary only), heat exchangers, tanks, orifices, thermowells, sight glasses, piping, tubing, and fittings. The applicant later identified additional pipe/fittings and valves present in the component cooling water system as subject to an AMR in its September 26, 2002, response to

RAI 2.1-1 (discussed in Section 2.1 of this SER). The applicant identified the intended functions of the component cooling water system components subject to an AMR as pressure boundary, heat transfer, and throttling.

2.3.3.2.2 Staff Evaluation

The staff reviewed Section 2.3.3.2 of the LRA, and the associated license renewal boundary drawings, to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the component cooling water system that are within the scope of license renewal, in accordance with 10 CFR 54.4(a). The staff then reviewed the AMR results provided in Table 3.3-2 of the LRA to determine whether the applicant appropriately identified the components belonging to the component cooling water system that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the component cooling water system that were not listed in LRA Table 3.3-2 to verify that the applicant properly identified the components that meet the above requirements. The staff also reviewed Section 9.2.2 of the St. Lucie UFSARs for Units 1 and 2 and did not identify any intended system functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.3.3.2 of the applicant's LRA.

As a result of this review, the staff identified the need for additional information. By letter dated July 18, 2002, the staff requested the applicant to justify why four temporary air chillers attached to the essential component cooling water loops shown on St. Lucie Unit 1 drawing 1-CCW-01, were not identified as being within the scope of license renewal. The staff added that these chillers were not described in the Unit 1 UFSAR (RAI 2.3.3-1).

In its response dated October 3, 2002, the applicant stated that the chillers attached to the component cooling water system are temporary, rented units utilized for air conditioning the containment for human comfort during refueling outages. The chillers supply chilled water to the containment fan coolers through "outage use only" chiller connections to the component cooling water piping, and are not utilized during normal power operations. Per the St. Lucie Technical Specifications, containment fan cooler operability is required in modes 1, 2, and 3. Prior to operating the chillers, which may only be operated in Modes 5 and 6, the component cooling water header supply and return to the fan cooler units are isolated by closing MV-14-5, MV-14-6, MV-14-7, and MV-14-8, as shown on license renewal boundary drawing 1-CCW-01. Therefore, the integrity of the pressure boundary of the "in-use" safety-related portions of the component cooling water system would not be affected by any postulated failures of the temporary chillers. Containment isolation during modes 5 or 6 is provided by manual valves SB14517, SB14518, SB14519, and SB14520 (shown on license renewal boundary drawing 1-CCW-01), as identified on Unit 1 UFSAR Table 6.2-16. Accordingly, the chiller connections are classified as non-nuclear-safety-related, and the temporary air conditioning chillers do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4(a).

The staff finds the applicant's response acceptable on the basis that (1) the pressure boundary integrity of the "in-use" safety-related portions of the component cooling water system would not be affected by failures of the temporary chillers, and (2) the temporary air conditioning chillers do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4(a).

The staff review found that the components of the component cooling water system that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.3.2.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the component cooling water system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.3.3 Demineralized Makeup Water

In Section 2.3.3.3 of the LRA, the applicant identifies the components of the Unit 2 demineralized makeup water (DW) system that are within the scope of license renewal and subject to an AMR. The DW system is described in Section 9.2.3 of the Unit 2 UFSAR.

The Unit 1 DW system is not identified as within the scope of license renewal in the LRA as originally submitted. However, in the response, dated September 26, 2002, to the staff's RAI concerning non-safety-related SCs whose failure could prevent satisfactory accomplishment of the function of safety-related SCs, the applicant included components of the Unit 1 DW system that are within the scope of license renewal and subject to an AMR. The Unit 1 DW system is described in Section 9.2.5 of the Unit 1 UFSAR.

2.3.3.3.1 Technical Information in the Application

As stated in the UFSARs, the DW systems for both Units 1 and 2 are non-safety-related systems and serve no safety-related functions. No DW system line penetrates the containment. Water from the common site makeup demineralizer is provided to the makeup water systems for each unit, which supply demineralized water for makeup to a number of systems, including diesel generator cooling water makeup and turbine cooling water.

The DW systems are in the scope of license renewal because they contain structures or components whose failure could prevent satisfactory accomplishment of the intended function of safety-related structures of components. The LRA identifies components of the Unit 2 DW system which enter and are routed in the diesel generator building as being subject to an AMR. These components were designed to seismic Category I requirements to preclude their failure during a seismic event. In response to the staff's RAI 2.1-1, the applicant included additional components located in the Unit 2 auxiliary building as being subject to an AMR.

None of the Unit 1 DW system piping and components were initially identified as subject to an AMR by the applicant in the LRA, because none of the Unit 1 DW system components are designed to seismic Category I requirements. However, in response to the staff's RAI 2.1-1, the applicant identified DW components located in the Unit 1 EDG buildings and the Unit 1 auxiliary building whose failure could prevent satisfactory accomplishment of the intended function of a safety-related SC. The applicant included these components as additional components to be subject to an AMR.

In Table 3.3-2 of the LRA, the applicant identified the following Unit 2 DW system component types as subject to an AMR—valves, piping/fittings, and bolting (mechanical closures). As discussed above, and in Section 2.1 of this SER, the applicant also identified the DW system pipe/fittings and valves located in the Unit 1 EDG buildings and the Unit 1 auxiliary building as subject to an AMR in the response to the staff's RAI 2.1-1. The intended function for DW components subject to an AMR is pressure boundary.

2.3.3.3.2 Staff Evaluation

The staff reviewed Section 2.3.3.3 of the LRA, and the associated license renewal boundary drawings, to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the DW system that are within the scope of license renewal, in accordance with 10 CFR 54.4(a). The staff reviewed Table 3.3-3 of the LRA to determine whether the applicant appropriately identified the components of the DW system that are subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the DW system that were not listed in Table 3.3-3 to verify that the applicant appropriately identified the components that meet the above requirements. The staff also reviewed Sections 9.2.5 and 9.2.3 of the UFSARs for Units 1 and 2, respectively, and did not identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.3.3.3 of the LRA.

In a meeting with the staff on June 10 and 11, 2002, the applicant clarified the intended support function of the DW system that led to its determination that a portion of the Unit 2 piping for this system is in the scope of license renewal. Also, the applicant confirmed that the Unit 1 DW system piping does not perform an intended function of pressure boundary, however, the components of the Unit 1 DW system were being brought within the scope of license renewal in response to the staff's RAI 2.1-1. In the response to the staff's RAI 2.1-1, the applicant states, in part, that it evaluated the potential for non-safety-related structures or components having a spatial interaction with safety-related structures and component in each of the Units 1 and 2 structures and areas that contained piping and components of the DW system. Consequently, the applicant bought into scope additional Unit 2 DW components in the Unit 2 auxiliary building, and Unit 1 DW components in the Unit 1 diesel generator building and the Unit 1 auxiliary building.

The staff finds the applicant's response to the portion of RAI 2.1-1 that relates to the DW system to be acceptable on the basis that (1) it clarifies the basis for the DW system to be considered within the scope of license renewal because the DW system contains non-safety-related structures or components whose failure could prevent satisfactory accomplishment of the intended functions of safety-related structures or components, and (2) it identifies the components which are subject to an AMR for both units.

The staff's review found that the components of the DW system that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.3.3.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the DW system components subject to an AMR, in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.3.4 Diesel Generators and Support Systems

In Section 2.3.3.4 of the LRA, the applicant identifies the components of the emergency diesel generators (EDGs) and support systems that are within the scope of license renewal and subject to an AMR. These systems are further described in Sections 8.3 and 9.5 of the UFSARs for both St. Lucie Units 1 and 2.

2.3.3.4.1 Technical Information in the Application

The EDGs provide AC power to the onsite electrical distribution system to assure the capability for a safe and orderly shutdown. The following EDG support systems are necessary to ensure proper operation of the EDGs.

- air intake and exhaust
- air start
- fuel oil
- lube oil
- cooling water

Four EDGs supply independent standby AC power to Units 1 and 2. Each EDG set consists of two diesel engines mounted in tandem with a 3500 kW generator at Unit 1 and a 3800 kW generator at Unit 2, and auxiliary systems (air starting, fuel supply, cooling water, and lubricating oil).

In an SBO event where all offsite and onsite power sources fail except for one EDG from Unit 2, power is transferred from the only operating EDG from Unit 2 to one of the Unit 1 4.16kV Class 1E distribution busses via the SBO cross-tie. This SBO cross-tie connects the two safety-related swing 4.16kV busses, 1AB and 2AB.

With the exception of the diesel oil storage tanks, other components of the emergency portion of the auxiliary power system which are essential to shutdown and to maintain the units in a safe condition are housed within structures that are designed to withstand design-basis tornado wind loadings, missiles, and maximum flood levels.

Air Intake and Exhaust. The EDGs use intake air from the surrounding ambient air in the EDG building. Intake air entering the EDG building between Elevation 19 feet and 22.9 feet is turned upward and screened prior to entering the EDG room based on the building design, thus preventing missiles and precipitation from entering and adversely affecting EDG operation. Thus, the EDG combustion air intakes are protected from tornado-generated missiles and shielded from direct wind or rain. Air intake filters are also provided on the engine to remove particulate.

The EDG exhaust air system for each engine of the EDG set consists of an exhaust silencer and ducting. Exhaust bellows connect the engine housing to the exhaust system. The exhaust

ducting exits to the roof and is sized to avoid excessive back pressure. The roof exhausts are protected from tornado winds and external missiles, as well as precipitation, by barrier hoods.

Air Starting System. Each EDG set has an independent air starting system. Each EDG is provided with two sets of two air receivers. Each set of air receivers has a sufficient air charge for starting a cold EDG set five times. Each EDG set is also provided with two air compressors; one is driven by a separate diesel engine and the other is driven electrically. These compressors provide charging air to the two sets of air receivers. The EDG sets are started by the air starting systems and do not depend on normal plant electrical power, except for the air start solenoid valves which require 125V DC power, or any other plant systems for starting operation.

Diesel Oil Fuel Supply System. The EDG fuel oil system is used to transfer diesel fuel oil from the onsite storage tanks to the day tanks which supply the EDG sets. Two completely redundant subsystems are provided, each consisting of a diesel oil storage tank, transfer pump, day tank, interconnecting piping and valves, and associated I&C. All electrical power necessary for operation of each subsystem is supplied from the associated EDG bus.

The two oil storage tanks have a combined usable capacity of 145 m^3 (38,350 gallons) which is sufficient for 8 days of post-LOCA load profile operation of one EDG set. Two cross-connects, each having locked closed double valves, exist between the discharges of the tanks. The two diesel oil day tanks each have a usable capacity of 0.6 m^3 (159 gallons). This is sufficient to allow 1.25 hours of full post-accident load operation of the associated EDG set.

Lube Oil System. Each engine of each tandem EDG set has a self-contained lube oil system consisting of a lube oil sump located at the base of the engine, a fuel pump, a main engine lube and piston cooling pumps, cooling water pumps, a scavenging pump, AC and DC motor driven soakback pumps, filter, strainer, heat exchanger, and associated piping. The lube oil heat exchanger is served by the EDG set cooling water system. In the normal EDG operating mode, no external source of power or other plant system is required for the EDG set lube oil system. In the standby mode, the lube oil is constantly circulated by the AC soakback pump and warmed when the EDG is not operating. Warming is accomplished by passing the oil through the lube oil heat exchanger which receives warm water via immersion heaters. The DC soakback pump serves as the backup upon loss of the AC pump.

Cooling Water System. Each engine in each EDG set has a self-contained cooling system which consists of a forced circulation cooling water system which cools the engine directly, and an air cooled radiator system which removes the heat from the cooling water. The system is pressurized, but contains a surge tank for water expansion. The cooling water pump and radiator fan are driven directly from the engine crankshaft. After starting, the EDG set cooling system requires no external source of power and does not depend on any plant cooling system.

Makeup water for normal maintenance functions is furnished from a normally isolated 2.5 centimeter (cm) (1 inch) diameter demineralized water line. The makeup water system is not essential for the successful continuous operation of the EDG. The engine lube oil is maintained at a "keep warm" temperature of between 52 °C and 68 °C (125 °F to 155 °F) by immersion heaters in the water jacket system which circulates warm water through the lube oil heat exchangers. Auxiliary lube oil pumps circulate the warmed lube oil continuously.

The applicant describes its process for identifying the mechanical components that are within the scope of license renewal in Section 2.1.2 of the LRA. EDGs and support systems are in the scope of license renewal because they contain structures or systems that are:

- safety-related and are relied upon to remain functional during and following DBEs
- non-safety-related whose failure could prevent satisfactory accomplishment of the intended function of safety-related SCs
- relied on during fire events
- are relied on during SBO events.

The applicant listed the following component types for the EDGs and support systems that are subject to an AMR in Table 3.3-4 of the LRA—pumps, valves, air start motors (pressure boundary only), tanks, heat exchangers, silencers, flame arresters, filters, strainers, flexible hoses, expansion joints, orifices, thermowells, sight glasses, piping, tubing, and fittings. The intended functions for the EDGs and support systems components subject to an AMR include pressure boundary, filtration, heat transfer, throttling, and fire spread prevention.

2.3.3.4.2 Staff Evaluation

The staff reviewed Section 2.3.3.4 of the LRA, and the associated license renewal boundary drawings, to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the EDGs and support systems that are within the scope of license renewal, in accordance with 10 CFR 54.4(a). The staff then reviewed the AMR results provided in Table 3.3-4 of the LRA to determine whether the applicant appropriately identified the components of the EDGs and support systems that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the EDG system that were not listed in Table 3.2-2 of the LRA to verify that the applicant appropriately identified the components that meet the above requirements. The staff also reviewed Sections 8.3 and 9.5 of the UFSARs for both Units 1 and 2, respectively, and did not identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.3.3.4 of the LRA.

The staff verified that those portions of the EDGs and support systems identified by the applicant as meeting the scoping requirements of 10 CFR 54.4(a), do in fact, meet these requirements for both units. The staff then focused its review on those portions of the EDGs and support systems that were not identified by the applicant as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4(a). The staff also reviewed the Sections 8.3 and 9.5 of the UFSARs to identify system intended functions that were not included in the LRA, and verified that these functions did not meet the scoping requirements of 10 CFR 54.4(a). Therefore, there is reasonable assurance that the applicant adequately identified all portions of the EDGs and support systems that are within the scope of license renewal, in accordance with 10 CFR 54.4(a).

The staff then determined whether the applicant had appropriately identified the in-scope SCs that are subject to an AMR in accordance with 10 CFR 54.21(a). The applicant identified the

SCs that are subject to an AMR for the EDGs and support systems and listed them in Table 3.3-4 of the LRA. The staff performed its review by sampling the SCs that the applicant identified as within the scope of license renewal, but not subject to an AMR to verify that these SCs perform their intended functions with moving parts or with a change in configuration or properties, or are subject to replacement based on qualified life or specified time period. Systems and components reviewed by the staff met the above criteria for Units 1 and 2.

In Section 2.3.3.4 of the LRA, the applicant lists seven license renewal boundary drawings for each unit that were highlighted to show the license renewal evaluation boundary for the EDGs and support systems. The staff compared the boundary drawings to the descriptions in the UFSARs to ensure that the boundary drawings were representative of the EDGs and support systems for the respective unit. The staff also sampled portions of the license renewal boundary drawings that were not highlighted to ensure that these components did not perform any of the intended functions associated with the scoping criteria of 10 CFR 54.4(a).

During its review of Section 2.3.3.4, the staff determined that additional information was needed to complete its review. In a letter dated July 18, 2002, the staff questioned the applicant about components that appeared to be subject to an AMR but were not included in Table 3.3.-4 of the LRA. Specifically, the staff observed that duplex, lube oil, and Y strainers and immersion heaters were not included in Table 3.3-4, but were shown to be within the scope of license renewal on drawings 1-EDG-02, 1-EDG-03, 1-EDG-05, 1-EDG-06, 2-EDG-02, 2-EDG-03, 2-EDG-05, and 2-EDG-06 (RAI 2.3.3-2). In its response dated October 3, 2002, the applicant stated that the duplex and Y strainers were included in the “filter housings” component group, and that the elements of lube oil strainers were included in the “filter elements” component group of Table 3.3-4. The staff finds the applicant’s response acceptable on the basis that the response clarifies that these components are within the scope of license renewal and subject to an AMR.

As for the immersion heaters, the applicant stated that the heater housings are included in Table 3.3-4 of the LRA in the "piping/fittings” component group, and that the heater elements are considered electrical components. The applicant also stated that in accordance with Section 2.5 of the LRA, the heaters are considered to be active components, therefore, no AMR is required. The staff finds the applicant’s response to be in agreement with the staff position delineated in a letter dated September 19, 1997, from Christopher I. Grimes, U.S. NRC, to Mr. Douglas J. Walters, NEI, on the subject of “Determination of Aging Management Review for Electrical Components,” and, therefore, considers the applicant’s response to be acceptable.

The staff’s review found that the components of the EDG and support systems that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.3.4.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the emergency diesel generator and support system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.3.5 Emergency Cooling Canal

In Section 2.3.3.5 of the LRA, the applicant identifies the structures of the emergency cooling canal, and the mechanical components located in the ultimate heat sink (UHS) dam, which are within the scope of license renewal and subject to an AMR. The emergency cooling canal is described in Section 9.2.7 of the Unit 1 UFSAR, and Section 9.2.5 of the Unit 2 UFSAR.

2.3.3.5.1 Technical Information in the Application

The emergency cooling canal mechanical components, located at the UHS dam, have the intended function of providing a safety-related secondary supply of water to the UHS for St. Lucie Units 1 and 2. (The primary source of UHS water is the ocean intake structure and intake canal.) The UHS dam is located between the intake canal and Big Mud Creek, which is connected to the Atlantic Ocean through the Indian River tidal lagoon. The mechanical components admit water from Big Mud Creek through two parallel 137 cm (54 inch) pipes with butterfly valves that are normally closed by pneumatic operators, and spring open upon loss of air supply. The structural components which comprise the emergency cooling canal and UHS dam are included in the civil/structural screening described in Sections 2.4.2.9 and 2.4.2.14 of the LRA, respectively.

The emergency cooling canal is in the scope of license renewal because it contains structures or components that are:

- safety-related and are relied upon to remain functional during and following DBEs, or
- non-safety-related whose failure could prevent satisfactory accomplishment of the intended function of safety-related SCs

In LRA Table 3.3-5, the applicant listed the following emergency cooling canal mechanical components subject to an AMR—valves (pressure boundary only), piping, and fittings. The applicant also identified the intended function of the emergency cooling canal mechanical components subject to an AMR as pressure boundary.

2.3.3.5.2 Staff Evaluation

The staff reviewed Section 2.3.3.5 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the emergency cooling canal that are within the scope of license renewal, in accordance with 10 CFR 54.4(a), and to verify that the applicant appropriately identified the SCs that are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the information presented in Section 2.3.3.5 of the LRA, the referenced site plan and piping and instrument drawings, and the UFSARs for both St. Lucie units to determine if the applicant adequately identified the portions of the emergency cooling canal that are within the scope of license renewal. The staff verified that the components of the emergency cooling canal that meet the scoping requirements of 10 CFR 54.4(a) were included within the scope of license renewal, and subject to an AMR, as identified by the applicant in Table 3.3-5 of the LRA. The staff sampled those components of the emergency cooling canal that were not listed

in LRA Table 3.3-2 to verify, with reasonable assurance, that the applicant properly identified the components that meet the criteria of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1).

As a result of this review, the staff questioned the applicant's omission, from the scope of license renewal, of certain safety-related air supply piping and components to the pneumatic actuators for the butterfly valves that control flow to the emergency cooling canal from Big Mud Creek. As detailed in a summary of the June 10 and 11, 2002, meeting dated July 31, 2002, the applicant stated that the butterfly valves are designed to fail open. Loss of air to the butterfly valves would result in the valves opening and performing their intended function of providing a source of cooling water for plant shutdown. The staff therefore concurred with the omission of these components from the scope of license renewal on the basis that the air supply system does not provide any intended function that meets the scoping criteria of 10 CFR 54.4(a).

The staff review found that the SCs of the emergency cooling canal system that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.3.5.3 Conclusions

On the basis of its review of the information contained in Section 2.3.3.5 of the LRA, the staff concludes that there is reasonable assurance that the applicant has appropriately identified the emergency cooling canal system components subject to an AMR, in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.3.6 Fire Protection

In Section 2.3.3.6 of the LRA, the applicant identifies the SCs of the fire protection system that are relied upon to demonstrate compliance with 10 CFR 50.48, and are within the scope of license renewal and subject to an AMR. The fire protection system is described in Appendix 9.5A, Section 3.1.3, of the St. Lucie UFSARs for both units.

2.3.3.6.1 Technical Information in the Application

In accordance with 10 CFR 54.4(a)(3), the SSCs that are relied upon in safety analyses or plant evaluations to demonstrate compliance with 10 CFR 50.48, the fire protection rule, are included within the scope of license renewal. An applicant is required to implement and maintain a fire protection program in accordance with the requirements stated in 10 CFR 50.48, to ensure safe plant shutdown in the event of a fire.

The fire protection system consists of subsystems for fire suppression water distribution and spray, RCP oil collection, and a Halon system for the Unit 1 RAB cable spreading room.

In Section 2.5 of the LRA, the applicant states that fire detection is included in the electrical/I&C screening. Fire detection is provided in areas that contain or present a fire hazard to equipment essential to safe plant shutdown. The automatic fire detection system incorporates ionization-type smoke detectors and thermal detectors capable of sensing fire in an early stage. The fire

detection system gives audible and visual alarms in the control room, with local means provided to identify which detector has actuated. The fire detection system annunciation in the control room is distinctive and unique so as not to be confused with other plant system alarms.

The Halon system provided in the Unit 1 cable spreading room is actuated by "cross-zoned" thermal detectors. Actuation of a thermal detector in zone "1" will energize a visual light alarm on a local graphic annunciator panel and an audible alarm (pre-discharge horn strobe lamp). Actuation of the adjacent thermal detector in zone "2" will energize the visual light alarm on the local graphic annunciator panel and will initiate the operation of the discharge alarm bell. In addition, a signal is transmitted to the Halon control panel which will shut down the fan units, and melt the fusible links in the fire damper to allow dampers to close. The actuation of the detector in zone "2" will also activate a 30-second release delay mechanism to provide time for final evacuation prior to actual release of the Halon.

Fire suppression includes the water distribution system, water spray and sprinkler systems, a Halon system (Unit 1 cable spreading room), standpipe and hose system, and portable extinguishers. Self-contained breathing apparatus are also essential to the manual fire suppression efforts of the plant fire brigade.

The fire water system is common for both Unit 1 and Unit 2. The primary source of water for the fire water system is a tap from the city water system of Fort Pierce, Florida. This supply is capable of delivering 75.7 liters per second (L/s) at 276 to 310 kPa (1200 gpm at 40 to 45 psi). This supply provides makeup water to two city water storage tanks (CWSTs) of 1893 m^3 (500,000 gallons) capacity, designed to ensure at least 757 m^3 (200,000 gallons) is maintained in each tank for FP. The CWSTs supply the intake for two electric motor driven fire water pumps, rated for 158 L/s at 862 kPa (2500 gpm at 125 psi).

The fire water system, when not operating, is kept pressurized by a hydropneumatic tank. The use of the hydropneumatic tank for small makeup and the maintenance of a system pressure helps prevent frequent starting of the motor driven pump. This tank pressure is maintained in the range of 756 to 963 kilopascals (kPa) (95 to 125 psig) by the domestic water pumps. If a manual or automatic fire suppression system is actuated, causing fire water system pressure to decrease, both fire pumps start automatically when header pressure drops to below 688 kPa (85 psig).

The pump controllers meet nuclear grade Class 1E control requirements, but are not in compliance with National Fire Protection Association (NFPA) 20, in that neither a timing device nor pressure switches for sequential pump starts are installed, as required by NFPA 20. The pumps are powered by separate electrical busses to prevent system electrical overload.

Fire suppression systems are provided in various plant areas to mitigate the consequences of fires. Four types of fixed fire suppression systems are used at St. Lucie, three of which are water-based. Pre-action systems are used indoors for the protection of safety-related equipment. Wet pipe systems are used in the turbine building to protect non-safety-related systems and to protect the two equipment hatches and the east stair Thermo-lag enclosure in the RAB. Fixed water spray systems are used in the yard to protect transformers and local hazards in the turbine building. The Halon system is used to protect the RAB cable spread room.

The FP system contains structures or components that are:

- non-safety related whose failure could prevent satisfactory accomplishment of the intended functions of safety-related structures or components, or

- relied on during fires events.

In Sections 2.1.1.4.1 and 2.3.3.6 of the LRA, the applicant identifies the source documents used in the FP scoping and screening effort as detailed in Appendix 9.5A of the UFSARs for Units 1 and 2, essential equipment lists, SSAs and St. Lucie licensing correspondence, design basis-documents, component database, and design drawings. These documents and drawings were reviewed to identify the SCs of the fire protection system that perform the intended functions of fire detection, fire suppression, and fire barriers.

In Tables 3.3-6 and 3.5-8 of the LRA, the applicant listed the fire protection components as being subject to an AMR—tanks, pumps and valves (pressure boundary only), sprinkler heads, nozzles, vortex breakers, hydrants, flexible hoses, drip pans, orifices, piping, tubing, and fittings. Hose stations are included as component types, "nozzles" and "fittings, in Section 3.3 and listed in Table 3.3-6 of the LRA. Hose racks are included as component type "component supports (non-safety-related)" in the civil/structural AMR in Section 3.5.2. In Tables 3.3-6 and 3.5-8, of the LRA, the applicant lists the intended functions for fire protection components subject to an AMR as pressure boundary, throttling, vortex prevention, and spray.

Other SSCs required for safe shutdown are addressed in the system of which they are a part. Fire rated assemblies, fire barriers, and structural components required to ensure adequate Halon concentrations are included in the civil/structural screening described in Section 2.4 of the LRA. Fire detection is included in the electrical/I&C screening described in Section 2.5. Features like sight glasses and flame arrestors associated with the EDGs are addressed with the EDGs and supporting systems (Section 2.3.3.4).

2.3.3.6.2 Staff Evaluation

The staff reviewed Sections 2.1.1.4.1 and 2.3.3.6 of the LRA, and the associated license renewal boundary drawings, to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the fire protection system that are within the scope of license renewal, in accordance with 10 CFR 54.4(a). The staff then reviewed the AMR results provided in Table 3.3-6 of the LRA to determine whether the applicant appropriately identified the components belonging to the fire protection system that are subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the FP system that were not listed in Table 3.3-6 to verify that the applicant properly identified the components that meet the above requirements. The staff also reviewed Appendix 9.5A of the St. Lucie Units 1 and 2 UFSARs and did not identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.3.3.6 of the applicant's LRA.

Manual fire suppression is provided by standpipe and hose stations and portable extinguishers. LRA Section 2.3.3.6 states that fire extinguishers, fire hoses, and air packs are not subject to an AMR because they are replaced based on condition, in accordance with 10 CFR

54.21(a)(1)(ii). The following standards form the basis for plant surveillance procedures for fire protection equipment:

- NFPA 10, "Portable Fire Extinguishers"
- NFPA 14, "Standpipe and Hose Systems"
- NUREG/CR-0041, "Manual of Respiratory Protection Against Airborne Radioactive Material"

The staff reviewed Tables 3.3-6 and 3.5-8 to determine whether the applicant appropriately identified the components belonging to the FP system that are subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the FP system that were not listed in Tables 3.3-6 and 3.5-8 to verify that the applicant properly identified the components that meet the above requirements.

In a letter dated July 18, 2002, the staff asked the applicant to identify where the suppression systems for the cable spreading rooms are located on the license renewal boundary drawings, or provide a description of the systems, since the staff could not locate these systems on the license renewal boundary drawings provided for the review (RAI 2.3.3-3).

By letter dated October 3, 2002, the applicant responded that there are no piping and instrument drawings for the Unit 1 Halon system. This system is described in the St. Lucie Unit 1 UFSAR, Appendix 9.5A, Section 3.3. The Unit 2 cable spreading room pre-action sprinkler system is only shown on vendor drawings and, thus, was not included with the LRA boundary drawings. License renewal boundary drawings 1-FP-04 and 2-FP-01 show part of the supply piping to the pre-action system, and Note 1 on these drawings explains that the remainder of the system is shown on vendor drawings. The Unit 2 cable spreading room pre-action sprinkler system is described in the Unit 2 UFSAR, Appendix 9.5A, Section 3.3. All passive, long-lived components associated with the Unit 1 Halon system and Unit 2 cable spreading room pre-action sprinklers are included in Table 3.3-6, except for the Halon system nitrogen tank discussed below. The staff finds the applicant's response to be acceptable on the basis that it identified acceptably detailed descriptions of the components of the Halon and pre-action sprinkler systems.

Comparing the applicable information contained in the LRA with the UFSAR, the staff identified SSCs in the UFSAR that were not included within the scope of license renewal. A sampling review by the staff has identified the hydropneumatic tank and appurtenances (provides pressure maintenance for fire water system) and nitrogen tank for gaseous extinguishing system (pilot pressure for system actuation) that are included in the safety analysis, yet were not identified to be within the scope of license renewal.

In a letter dated July 18, 2002, the applicant was asked to clarify the current licensing basis, consistent with 10 CFR 50.48, with respect to scoping for license renewal, and to justify why these SSCs listed in the UFSAR are considered to be outside the scope of license renewal (RAI 2.3.3-15).

By letter dated October 3, 2002, the applicant responded that the hydropneumatic tank was determined not to be in the scope of license renewal because it was the applicant's contention

that the hydropneumatic tank does not perform or support any system intended functions that satisfy the scoping criteria of 10 CFR 54.4(a).

The staff evaluated the applicant's position concerning the hydropneumatic tank, and studied the relevant documents in the NFPA 20; St. Lucie UFSAR, Appendix 9.5A for both units; Unit 1 UFSAR, Section 9.2.6.2; Unit 2 UFSAR, Sections 9.2.4.2; and the associated SERs. The staff concluded, based upon this review, that the pressure maintenance function provided by the hydropneumatic tank at the St. Lucie site serves in lieu of the jockey pumps/pressure maintenance device required by NFPA 20. The requirement for jockey pumps/pressure maintenance device is stated in Section 31(e) of the 1972 edition of NFPA 20, cited by the St. Lucie UFSARs as part of the original licensing basis for the plant. The staff based this conclusion, in part, on the fact that the hydropneumatic tank, and its associated domestic water pumps and piping, perform a pressure maintenance function which protects the large fire pumps from damage during low-flow-high-pressure operation. The staff, therefore, disagrees with the applicant's response to RAI 2.3.3-15 concerning the hydropneumatic tank.

The applicant decided to supplement its response to RAI 2.3.3-15 by letter dated November 27, 2002 to include the hydropneumatic tank, as well as the domestic water pumps, associated valves, and piping/fittings that supply makeup water to this tank in Table 3.3-6.

Some of the boundaries established in the pressure maintenance system are not closed valves. The hydropneumatic tank contains a low-pressure switch which initiates an alarm upon low pressure. Plant operators periodically check the hydropneumatic tank and domestic water pumps for abnormal conditions. If a break were to occur downstream of these boundaries, the break could be isolated at the valves located at the boundaries. Also, in the event of a drop in pressure in the fire protection pressure maintenance system to below the starting pressure of the fire pumps, the fire pumps would start. Throughout this transient, pressure would be maintained on the fire protection system. Plant experience indicates that any negative effects of an occasional transient of this type would be minimal. The staff has reviewed this justification for license renewal boundaries at open valves and finds it acceptable.

Regarding the nitrogen tank, the applicant's October 3, 2002, response stated that Appendix 9.5A of the Unit 1 UFSAR, Section 3.1.3, page 9.5A-117 describes the nitrogen tank as a small, vendor-supplied cartridge. This cartridge is in the scope of license renewal, and was inadvertently omitted from Table 3.3-6 of the LRA. Table 3.3-6 is modified to include it. The staff finds the applicant's response to be acceptable, on the basis that this component is included within the scope of license renewal and subject to an AMR.

The applicant responded that the Halon system in the Unit 1 cable spreading room was in scope, although it does not appear on the P&IDs.

The staff finds the applicant's response to RAI 2.3.3-15 concerning the hydropneumatic tank, nitrogen tank, and Halon system to be acceptable on the basis that these components are included within the scope of license renewal and subject to an AMR, in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

The staff review found that the components of the FP system that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license

renewal, and are subject to an AMR, in accordance with 10 CFR 54.21(a)(1). On the basis of its review of the information presented in Section 2.3.3.6 of the LRA, and the applicant's responses to the staff's RAIs, the staff did not identify any omissions.

2.3.3.6.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the fire protection system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.3.7 Fuel Pool Cooling

In Section 2.3.3.7 of the LRA, the applicant identifies the components of the fuel pool cooling system that are within the scope of license renewal and subject to an AMR. These systems are further described in Sections 9.1.3 of the UFSARs for Units 1 and 2.

2.3.3.7.1 Technical Information in the Application

During normal operation, fuel pool cooling removes decay heat from the fuel pool by circulating water through the fuel pool heat exchangers. The heat from the fuel pool is transferred to the component cooling water.

The safety-related means of fuel pool cooling for Unit 1 is pool boil off and addition of makeup water without forced circulation through the heat exchanger.

The safety-related means of fuel pool cooling for Unit 2 is recirculation through the fuel pool heat exchangers. As a backup, Unit 2 fuel pool cooling can be accomplished by pool boil off and addition of makeup water.

The applicant describes its process for identifying the mechanical components that are within the scope of license renewal in Section 2.1.2 of the LRA. Fuel pool cooling is in the scope of license renewal because it contains structures or systems that are:

- safety-related and are relied upon to remain functional during and following DBEs
- non-safety-related whose failure could prevent satisfactory accomplishment of the safety-related functions of strictures or components

The applicant listed the following component types for the fuel pool cooling components that are subject to an AMR in Table 3.3-7 of the LRA—pumps and valves (pressure boundary only), heat exchangers, thermowells, piping, tubing, and fittings. The intended functions for fuel pool cooling components subject to an AMR include pressure boundary and heat transfer.

2.3.3.7.2 Staff Evaluation

The staff reviewed Section 2.3.3.7 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the fuel pool cooling system

within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

The staff reviewed the text, tables, and diagrams submitted by the applicant in Section 2.3.3.7 of the LRA and the UFSARs to determine whether any SCs portions of the fuel pool cooling system may meet the scoping criteria in 10 CFR 54.5(a) may have been omitted from the scope of license renewal. Accordingly, the staff focused its review on those portions of the fuel pool cooling system that were not identified by the applicant as within the scope of license renewal to determine whether they meet the scoping requirements of 10 CFR 54.4 (a). The staff also reviewed Sections 9.1.3 of the UFSARs for Units 1 and 2 to identify system intended functions that were not included in Section 2.3.3.7 of the LRA, and verified that these functions did not meet the scoping requirements of 10 CFR 54.4(a).

The staff then determined whether the applicant had appropriately identified the in-scope SCs that are subject to an AMR in accordance with 10 CFR 54.21(a). The applicant identified the SCs that are subject to an AMR for the fuel pool cooling system and listed them in Table 3.3-7. The staff performed its review by sampling the SCs that the applicant identified as within the scope of license renewal, but not subject to an AMR to verify that these SCs perform their intended functions with moving parts or with a change in configuration or properties, or are subject to replacement based on qualified life or specified time period. SCs reviewed by the staff met the above criteria for Units 1 and 2.

In Section 2.3.3.7 of the LRA, the applicant lists one license renewal boundary drawing for each unit that was highlighted to show the license renewal evaluation boundary for the fuel pool cooling system. The staff compared the boundary drawings to the descriptions in the UFSARs for Units 1 and 2 to ensure that the boundary drawings were representative of the fuel pool cooling system for the respective unit. The staff also sampled portions of the boundary drawings that were not highlighted to determine whether any of these components perform an intended function associated with the scoping criteria of 10 CFR 54.4(a).

During its review of Section 2.3.3.7, the staff determined that additional information was needed to complete its review. At Unit 1, the makeup water sources include the refueling water storage tank via the fuel pool purification pump and the primary water tank. At Unit 2, makeup to the fuel pool is also provided from the refueling water tank via the refueling water pool purification pump and from the primary water tank. The UFSARs for Units 1 and 2 describe these makeup sources; however, license renewal boundary drawings 1-SFP-01 and 2-SFP-01 do not show the piping and valves associated with the makeup line from the refueling water storage tank or the primary water tank to be within the scope of license renewal. In a letter dated July 18, 2002, the staff asked the applicant to justify why the piping and valves are considered not within the scope of license renewal, and therefore not subject to an AMR (RAI 2.3.3-4).

By letter dated October 3, 2002, the applicant responded by referring to Section 9.2.3 of the original SER for Unit 1 which states that a fire hose can be connected to the seismic Category I intake cooling water system at two points to provide makeup. The original SER stated further that if NRC review indicated that unacceptable damage could be caused, the fuel exposed to salt water would not be reloaded into the reactor, and that, on the basis of this requirement, the design was acceptable. The results of further NRC review are discussed in Supplement 1 to this SER. Section 9.2.3 of Supplement 1 to this SER states that this evaluation was performed,

and that for the anticipated time that the salt water makeup would be in use, no unacceptable corrosion of fuel elements or support structures would occur. On the basis of additional information provided, the NRC also concluded that it would be unlikely that the sea water method of cooling would be needed since several other makeup sources are available. Further, after describing the availability of makeup from the refueling water storage and primary water tanks, both UFSARs for Units 1 and 2 describe the intake cooling water source of makeup water as a seismic Category I backup supply of spent fuel pool makeup water.

After reviewing the applicant's response, the staff consulted the NRC correspondence archive to clarify the basis for conclusions presented in the original SER and SER supplements. On June 7, 1974, Mr. Robert Uhrig, Vice President of FPL, submitted a response to NRC questions entitled, "Amendment 26 to the Final Safety Analysis Report." In question 9.6, the NRC stated that the non-seismic Category I classification of those portions of the fuel pool system which perform the cooling function is unacceptable. In response, FPL committed to provide a siamese connection on each intake cooling water header in the component cooling water heat exchanger area, a standpipe on the fuel handling building will be provided from grade to the operating deck elevation, and siamese connections will be provided at both ends of the standpipe. The FPL response concluded, "Thus, via [sic] firehose, the fuel pool makeup can be readily supplied by the intake cooling water pumps. The head provided by these pumps is sufficient."

For both Unit 1 and Unit 2, the DBEs requiring use of spent fuel pool makeup water for mitigation are spent fuel pool leakage and loss of forced cooling. Although a seismic event is a potential cause of both events, it is not the only potential cause. As an example, the Unit 2 spent fuel pool cooling system is qualified to withstand a seismic event, yet a loss of forced cooling is described as a design basis event. The applicant's 1974 addition of the seismically qualified, temporary connections to the salt water intake cooling water system as a makeup source responded to the concern that the cooling system for Unit 1 was not seismically qualified. However, as discussed in the SERs and UFSARs for Units 1 and 2, the availability of diverse fresh water sources as well as this backup salt water source were considered in evaluating the capability of mitigating a design basis loss of forced cooling event. Because the spent fuel pool lacks the defense-in-depth provided by the containment structure for reactor accidents, defense-in-depth for the spent fuel is instead provided by a structure that reliably prevents a rapid loss of coolant and highly reliable and/or diverse means of making up for slow losses of coolant. Although the intake cooling water system itself is highly reliable, the provision of makeup water from this source though a temporary hose connection is not as reliable as the provision of makeup water from a permanently installed, safety-related makeup system with redundant flow paths. Safety Guide 13, "Spent Fuel Storage Facility Design Basis," which had been issued prior to the construction permit for Unit 1, delineated such a reliable makeup system. Therefore, the staff concluded that the design basis reliability of spent fuel pool makeup in mitigating a leakage or loss of forced cooling event is only satisfied by the combination of the non-safety related, permanently installed clean water makeup sources and the temporary hose connection to the safety-related intake cooling water system as a source of saltwater makeup.

Components within the scope of license renewal are prescribed by the requirements of 10 CFR 54.4 (a). As specified in 10 CFR 54.4 (a) (2), all non-safety related components whose failure could prevent satisfactory accomplishment of functions that prevent accidents that could result

in potential offsite exposure comparable to the guidelines of 10 CFR 100.11 are within scope. The ability to reliably provide makeup water in response to leakage or loss of forced cooling prevents inadequate cooling of stored irradiated fuel, which is an accident with potential offsite exposure comparable to the guidelines of 10 CFR 100.11. Accordingly, the applicant's omission of the makeup water paths from the refueling water storage and primary water tanks to the spent fuel pool from the scope delineated in the LRA is not consistent with the requirements of 10 CFR 54.4(a)(2). This is Open Item 2.3.3.7-1.

The staff compared the components listed in Table 2.3.3-7 of the LRA to those highlighted on the license renewal boundary drawings, and found them consistent with the components highlighted on the boundary drawings. On the basis of its review of the LRA, the UFSARs, associated SERs, and the applicant's responses to RAIs, the staff did not identify any omissions.

2.3.3.7.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the fuel pool cooling system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.3.8 Instrument Air

In Section 2.3.3.8 of the LRA, the applicant identifies the components of the instrument air system that are within the scope of license renewal and subject to an AMR. This system is further described in Section 9.3.1 of the UFSARs for both St. Lucie Units 1 and 2.

2.3.3.8.1 Technical Information in the Application

The instrument air system has the intended function of providing a reliable source of dry, oil-free air for I&C and pneumatic valves. Instrument air provides motive power and control air to safety-related and non-safety-related components. Only a limited number of components in the scope of license renewal require instrument air to perform their intended function. Therefore, only those portions of the system that are in the main flow path from the instrument air compressors to the applicable components are designated as within the scope of license renewal.

The applicant states that some of the license renewal boundaries of the instrument air system were established at normally open valves. The following reasons explain why the applicant considers this approach acceptable for the instrument air system.

- Instrument air supplies air to many active components required for normal plant operation, and loss or reduction of air pressure due to degraded conditions is detected early.

- Instrument air is predominantly constructed of galvanized carbon steel and bronze with an internal environment of dry air, making it very resistant to general corrosion.

- The limited number of valves that rely on instrument air are only required for maintaining hot standby conditions for SBO events, or achieving cold shutdown during and following

design basis fires. Both of these situations would permit ample time for manual isolation of portions of instrument air not within the scope of license renewal, if required.

Instrument air is in the scope of license renewal because it contains structures or systems that are:

- safety-related and are relied upon to remain functional during and following DBEs
- non-safety-related whose failure could prevent satisfactory accomplishment of the intended function of safety-related structures or systems
- part of the EQ Program
- are relied on during fire events
- relied on during SBO events (Unit 1 only)

In Table 3.3-8 of the LRA, the applicant listed the following component types for the instrument air components that are subject to an AMR include valves (pressure boundary only), receivers, accumulators, dryers, filters, strainers, heat exchangers, flexible hoses, orifices, silencers, thermowells, sight glasses, rupture discs, piping, tubing, and fittings. The intended functions for instrument air components subject to an AMR include pressure boundary, heat transfer, filtration, and throttling.

2.3.3.8.2 Staff Evaluation

The staff reviewed Section 2.3.3.8 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the components of the instrument air system that are within the scope of license renewal, in accordance with 10 CFR 54.4(a). The staff then reviewed the AMR results provided in Table 3.3-8 of the LRA to determine whether the applicant adequately identified the components of the instrument air system that are subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the instrument air system that were not listed in Table 3.3-8 to verify that the applicant appropriately identified the components that meet the above requirements. The staff also reviewed Section 9.3.1 of the UFSARs for Units 1 and 2 and did not identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.3.3.8.

In Section 2.3.3.8 of the LRA, the applicant lists several license renewal boundary drawings for each unit that were highlighted to show the license renewal evaluation boundary for the instrument air system. The staff compared the boundary drawings to the descriptions in the UFSARs to ensure that the boundary drawings were representative of the instrument air system for the respective unit. The staff also sampled portions of the boundary drawings that were not highlighted to ensure these components did not perform any of the intended functions associated with the scoping criteria of 10 CFR 54.4(a).

During its review of Section 2.3.3.8 of the LRA, the staff determined that additional information was needed to complete its review. In a letter dated July 18, 2002, the staff questioned the

applicant about components that appeared to be subject to an AMR but were not included in Table 3.3-8 of the LRA. Specifically, the staff observed that an oil/water separator (license renewal boundary drawing 1-IA-06 at location F6), moisture separators (license renewal boundary drawing 1-IA-06 at locations C3 and E3, and license renewal boundary drawing 2-IA-04 at locations B3 and D3), and oil coolers (license renewal boundary drawing 2-IA-04 at locations F2 and H2) were not included in Table 3.3-8. In its response dated October 3, 2002, the applicant clarified that the oil/water separator and moisture separators are included in the component group "filters," and are listed in Table 3.3-8 of the LRA. The applicant stated that the oil coolers in question are internal to the compressors and were thus treated as integral parts of the compressor. Since the instrument air compressors are active components, they are not subject to an AMR which is consistent with the requirements of 10 CFR 54.21 (a)(1)(i) and the guidance of NEI 95-10. The staff finds the applicant's response to be acceptable on the basis that the oil coolers are an integral part of the air compressors, which are considered an active component, in accordance with the requirements of 10 CFR 54.21 (a)(1)(i) and the guidance of NEI 95-10.

The staff also questioned the exclusion of instrument air dryers at Unit 2 (license renewal boundary drawing 2-IA-04) from an AMR. In Section 9.3.1 of the UFSARs for Units 1 and 2, the applicant discusses the ability to cross-connect the instrument and station air systems for Units 1 and 2. In its response dated October 3, 2002, the applicant stated why the Unit 2 instrument air compressors and air dryers are not relied on to perform or support any system intended functions that satisfy the scoping criteria of 10 CFR 54.4(a) for Unit 2. In its explanation, the applicant stated that the Unit 2 instrument air compressors 2A and 2B are included in the scope of license renewal because they are credited for supplying air for isolation of the Unit 1 feedwater control valves during certain postulated fire events on Unit 1. The Unit 2 air dryers are located downstream of the cross-connect line to Unit 1 (license renewal boundary drawing 2-IA-04 at location F7) and are not in service during this operational alignment. Therefore, the Unit 2 air dryers are not within the scope of license renewal. The staff finds this response to be acceptable on the basis that it clarifies that the instrument air dryers at Unit 2 do not perform an intended function within the scope criteria of 10 CFR 54.4(a).

Related to this issue, the staff questioned why piping and components associated with two of the Unit 1 air compressors (air compressors 1C and 1D) are considered to be outside the scope of license renewal. In its response dated October 3, 2002, the applicant stated that during a Unit 1 SBO event, Unit 1 instrument air compressors 1C and 1D do not operate since they are supplied by non-vital power. Unit 1 instrument air compressors 1A and 1B are, however, credited for a Unit 1 SBO event because they can be manually loaded onto a vital bus, and powered via the 4kV cross-tie from Unit 2 by one of the two Unit 2 EDG. Therefore, Unit 1 instrument air compressors 1C and 1D are not required to perform or support any system intended functions that satisfy the scoping criteria of 10 CFR 54.4(a). On the basis of the explanation provided and the criteria set forth in 10 CFR 54.4(a), the staff finds this response to be acceptable.

As discussed above, the applicant stated in Section 2.3.3.8 of the LRA that some of the license renewal boundaries for the instrument air system were established at normally open valves, and justified for doing so. The staff observed that in certain cases, failure of the downstream piping may affect the pressure boundary intended function. On July 18, 2002, the staff asked the applicant to provide additional information to support the basis for their determination that it was

acceptable for boundaries to be at normally opened valves, such as information about whether SBO and fire procedures specified closing these valves, the amount of time required to complete procedure actions, and the availability of sufficient air inventory if the valves are not closed.

In its response dated October 3, 2002, the applicant reiterated the information stated in the LRA (presented above), and provided the following new information:

> Instrument air boundaries have been established at the first manual isolation valves on branch lines off of these required flow paths. It is not expected that these open valves would actually require closing, only that sufficient time exists if closure was needed. Therefore, procedure changes are not required. Although these boundary valves are normally open, they are considered acceptable license renewal boundaries because instrument air is designed with substantial redundancy and capacity.

The staff finds the applicant's response acceptable on the basis that the instrument air system is designed with substantial redundancy and capacity which permits ample time for manual isolation of portions of instrument air not within the scope of license renewal, if required.

The staff's review found that the SCs of the instrument air system that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.3.8.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified instrument air system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.3.9 Intake Cooling Water

In Section 2.3.3.9 of the LRA, the applicant identifies the components of the ICW system which are within the scope of license renewal and subject to an AMR. The ICW system is described in Sections 9.2.1 of the Units 1 and 2 UFSARs.

2.3.3.9.1 Technical Information in the Application

The ICW system has the intended function of removing heat from the component cooling water and turbine plant cooling water. The ICW pumps supply salt water from the intake canal for each unit through two redundant piping headers per unit on the tube side of the component cooling water and turbine cooling water heat exchangers. The component cooling water heat exchangers are considered to be part of the component cooling water system and were screened with that system (see SER Section 2.3.3.2). The turbine cooling water heat exchangers are considered to be part of the turbine cooling water system and were screened with that system (Unit 1 only, see SER Section 2.3.3.14). After flowing through the heat exchangers, the intake cooling water is discharged to the discharge canal. The intake cooling water has the additional intended function of providing a safety-related makeup water source for fuel pool cooling (described in SER section 2.3.3.7).

The ICW system is in the scope of license renewal because it contains structures or components that are:

- safety-related and are relied upon to remain functional during and following DBEs
- non-safety-related whose failure could prevent satisfactory accomplishment of the intended function of safety-related structures or components
- relied on during fire events

Based on the intended functions previously identified, the applicant listed the following ICW system components subject to an AMR in Table 3.3-9—pumps and valves (pressure boundary only), strainers, expansion joints, thermowells, orifices, piping, tubing, and fittings. In that table, the applicant identified the intended functions for the ICW components subject to an AMR as pressure boundary, filtration, and throttling.

2.3.3.9.2 Staff Evaluation

The staff reviewed Section 2.3.3.9 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the ICW system that are within the scope of license renewal, in accordance with 10 CFR 54.4(a), and to verify that the applicant appropriately identified the SCs that are subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff reviewed the information presented in Section 2.3.3.9 of the LRA, the referenced site plan and piping and instrument drawings, and the UFSARs for both St. Lucie units to determine if the applicant adequately identified the portions of the ICW system that are within the scope of license renewal. The staff verified that the components of the ICW system that meet the scoping requirements of 10 CFR 54.4 were included within the scope of license renewal, and are subject to an AMR, as identified by the applicant in Table 3.3-9 of the LRA. The staff sampled those components of the ICW system that were not listed in LRA Table 3.3-9 to verify, with reasonable assurance, that the applicant properly identified the components that meet the scoping criteria of 10 CFR 54.4.

As a result of this review, the staff questioned the applicant's omission, from the scope of license renewal, of certain safety-related components. By letter dated July 18, 2002, the staff requested the applicant to justify the omission of the stationary and traveling screens located at the rear of the intake structure, prior to the inlet to the ICW pumps. The staff believes that these screens prevent debris and organisms from causing the failure of the safety-related ICW pumps and strainers. As such, these screens would be within the scope of license renewal and subject to an AMR.

The applicant responded to this request on October 3, 2002, by stating that the stationary and traveling screens were determined not to be within the scope of license renewal because they do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4(a). These components support normal plant power operation, but their failure does not affect the safety-related function of ICW. During plant power operation, the non-safety-related circulating water pumps draw a significant flow of cooling

water through the intake structure to support main condenser cooling requirements. This high flow rate creates the potential for debris or organisms to enter the intake. As a result, stationary and traveling screens are provided to enhance reliability of plant power operation. In comparison to the circulating water pumps, the safety-related ICW pumps draw a small amount of cooling water through the intake. Any significant degradation or failures of the screens during power operation would be evident and detected by plant operators far in advance of a complete failure. Even in case of total failure, floating or heavy debris would not affect ICW pump operation due to the low velocities at the suction of the ICW pumps. As discussed in Section 9.2.1.3 of the Units 1 and 2 UFSARs, the ICW pumps and heat exchangers are evaluated for design basis accident heat removal with suspended materials of up to 1.3 cm (½ inch) and silt. Additionally, the component cooling water heat exchangers are protected from suspended solids by the basket strainers (which have differential pressure alarms in the control room) that are included in LRA Table 3.3-9 (pages 3.3-59 through 3.3-62). During emergency operation, the flow velocities in the vicinity of the stationary and traveling screens will be less than 4 centimeters/per second (cm/sec) (0.13 ft/sec).

The staff evaluated the applicant's response and concurs that during emergency operation, the low inlet flow velocity precludes the possibility of blockage due to silt and heavy debris buildup. Only light objects or suspended solids will be entrained into the intake flow; these will be caught in the basket strainers. Therefore, the stationary and traveling screens do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4(a). On the basis stated above, the staff finds the exclusion of these components from the scope of license renewal to be acceptable.

In the same July 18, 2002, letter, the staff also requested the applicant to justify the omission from LRA Table 3.3-9 of the temporary hoses used to provide the safety-related makeup water connection from the ICW system to SFP as described in Section 9.1.3.4.3.2 of the Unit 1 UFSAR. In its October 3, 2002 response, the applicant stated that hoses may be temporarily connected and utilized to provide makeup water to the SFP as a backup water source. Similar hose connections exist on the Unit 2 ICW and SFP cooling systems (Unit 2 UFSAR, Section 9.1.3). The hoses used for these connections are fire hoses obtained from any site fire hose house. As stated in Section 2.3.3.6 (page 2.3-19) of the LRA, fire hoses are within the scope of license renewal, but they are replaced on condition in accordance with NFPA guidelines, and, therefore, are not subject to an AMR.

The staff concurs with the applicant's exclusion of the fire hoses on the basis that these components are subject to replacement based on a qualified life or specified time period and as such, do not meet the criteria for being subject to an AMR stated in 10 CFR 54.21(a)(1)(ii).

The staff review found that the components of the ICW system that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.3.9.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the ICW system components subject to an AMR, in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.3.10 Miscellaneous Bulk Gas Supply

In Section 2.3.3.10 of the LRA, the applicant identifies the components of the miscellaneous bulk gas supply (MBGS) that are within the scope of license renewal and subject to an AMR. The MGBS storage facility is common to both units. This system is further described in Section 9.3.1 of the St. Lucie Unit 1 UFSAR.

2.3.3.10.1 Technical Information in the Application

The miscellaneous bulk gas supply system has the intended function of supplying hydrogen, carbon dioxide, and nitrogen required for plant operation. The MGBS consists of various storage facilities and associated components. Facilities for bulk storage of hydrogen in tube trailers and bottles is located approximately 120 feet north of the Unit 1 intake structure. Carbon dioxide is stored in bottles in the gas storage building, which is located adjacent to the bulk hydrogen storage facility. Bulk storage facilities for nitrogen are provided by a low-pressure nitrogen Dewar with two compressors, and a high-pressure tube trailer.

The MBGS is in the scope of license renewal because it contains structures or components that are:

- safety-related and are relied upon to remain functional during and following DBEs
- non-safety-related whose failure could prevent satisfactory accomplishment of the intended function of safety-related SCs
- relied on during fire events

On the basis of the intended functions, the applicant listed the following MGBS component types that are subject to an AMR in Table 3.3-10 of the LRA—valves (pressure boundary only), vessels, piping, tubing, and fittings. The intended function for MGBS components subject to an AMR is pressure boundary.

2.3.3.10.2 Staff Evaluation

The staff reviewed Section 2.3.3.10 of the LRA to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the MBGS within the scope of license renewal and subject to an AMR, have been identified in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

The staff reviewed Section 9.3.1 of the Unit 1 UFSAR to determine whether any SCs of the MBGS may have been omitted from the scope of license renewal that meet the scoping criteria in 10 CFR 54.4(a). The staff verified that those portions of the MBGS identified by the applicant as meeting the scoping requirements of 10 CFR 54.4(a), do in fact, meet these requirements for both units. The staff then focused its review on those portions of the MBGS that were not

identified by the applicant as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4(a). The staff also reviewed Section 9.3.1 of the St. Lucie Unit 1 UFSAR to identify system intended functions that were not included in Section 2.3.3.10 of the LRA, and verified that these functions did not meet the scoping requirements of 10 CFR 54.4(a). Therefore, there is reasonable assurance that the applicant appropriately identified portions of the MBGS that are within the scope of license renewal, in accordance with 10 CFR 54.4(a).

The staff then determined whether the applicant had appropriately identified the in-scope SCs that are subject to an AMR, in accordance with 10 CFR 54.21(a). In Table 3.3-10 of the LRA, the applicant identified the SCs that are subject to an AMR for the MBGS. The staff performed its review by sampling the SCs that the applicant identified as within the scope of license renewal, but not subject to an AMR to verify that these SCs perform their intended functions with moving parts or with a change in configuration or properties, or are subject to replacement based on qualified life or specified time period. Structure and components reviewed by the staff met the above criteria.

In Section 2.3.3.10 of the LRA, the applicant listed four license renewal boundary drawings that were highlighted to show the license renewal evaluation boundary for the MBGS. The staff compared the boundary drawings to the description in the UFSAR to ensure that the boundary drawings were representative of the MBGS for Units 1 and 2. The staff also sampled portions of the boundary drawings that were not highlighted to ensure that these components did not perform any of the intended functions associated with the scoping criteria of 10 CFR 54.4(a).

During its review of Section 2.3.3.10, the staff determined that additional information was needed to complete its review. The description provided in the Unit 1 UFSAR is limited. In addition, the referenced drawings are for various other systems which also include a portion of the MBGS. Therefore, the staff could not determine, with reasonable assurance, that the applicant had correctly identified the components that are within the scope of license renewal for the MBGS. In a letter dated July 18, 2002, the staff asked the applicant to provide a more detailed description of the MBGS, and additional information concerning the design and intended functions of the MBGS system. In its response dated October 3, 2002, the applicant stated that portions of the MBGS penetrate the containments, and thus provide a containment integrity function. The MBGS isolation valves which perform a containment integrity function are shown on license renewal boundary drawings 1-SAMP-02 (V29217, V29324, V29213, V29334, V29305, and V29306), and 2-SAMP-03 (V29455, V29434, and V29456). Additionally, portions of the MBGS form part of the boundary of interfacing safety-related components and thus provide a safety-related pressure boundary function (Unit 2 nitrogen supply to the containment spray hydrazine storage tank, valve V29431 and downstream piping on drawing 2-CS-01).

In addition, the applicant stated that the MBGS is relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with NRC regulations for fire protection (e.g., limiting hydrogen concentration anywhere in the Unit 2 RAB to less than 2 percent in the event of a hydrogen pipe rupture). Therefore, the excess flow isolation valve, V29462, and associated upstream piping and valve (license renewal boundary drawing 2-IA-05), are in the scope of license renewal.

The staff's review found that the components of the MGBS that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.3.10.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified MBGS components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.3.11 Primary Makeup Water

In Section 2.3.3.11 of the LRA, the applicant identifies the components of the primary makeup water system that are within the scope of license renewal and subject to an AMR. The system is described in Section 9.2.5 of the Unit 1 UFSAR, and Section 9.2.3 of the Unit 2 UFSAR.

2.3.3.11.1 Technical Information in the Application

The primary makeup water system provides treated, demineralized water of the required quality for makeup to various systems throughout the plants. The primary makeup water system piping penetrates the containments and functions as a part of the containment pressure boundary for both units. For Unit 2, the primary makeup water system intended functions also include FP and EQ. Unit 2 primary makeup water system piping that enters and is routed in the EDG building is seismically analyzed to preclude its failure during a seismic event.

The primary makeup water system is in the scope of license renewal because it contains structures or components that are:

- safety-related and are relied upon to remain functional during and following DBEs
- non-safety-related whose failure could prevent satisfactory accomplishment of the intended function of safety-related structures or components
- part of the EQ Program
- relied upon during certain fire events

The applicant listed the following primary makeup water system component types as subject to an AMR—tanks, pumps, and valves (pressure boundary only), nozzles, vortex breakers, expansion joints, orifices, piping, tubing, and fittings. As discussed in Section 2.1 of this SER, the applicant identified additional pipe/fittings and valves of the primary makeup water system as subject to an AMR in its September 26, 2002, response to RAI 2.1-1. The intended functions for primary makeup water components subject to an AMR include pressure boundary, vortex prevention, spray, and throttling.

2.3.3.11.2 Staff Evaluation

The staff reviewed Section 2.3.3.11 of the LRA, and the associated license renewal boundary drawings, to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the primary makeup water system that are within the scope of license renewal, in accordance with 10 CFR 54.4(a). The staff then reviewed the AMR results provided in Table 3.3-11 of the LRA to determine whether the applicant appropriately identified the components of the primary makeup water system that are subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the primary makeup water system that were not listed in Table 3.3-11 of the LRA to verify, with reasonable assurance, that the applicant appropriately identified the components that meet the above requirements. The staff also reviewed Section 9.2.5 of the Unit 1 UFSAR, and Section 9.2.3 of the Unit 2 UFSAR, and did not identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.3.3.11 of the LRA.

The staff requested clarification of several items regarding the primary makeup water system as detailed in the summary of the June 10 to 11, 2002, meeting dated July 31, 2002. The applicant clarified the location of a vortex breaker in the 150,000 gallon primary water storage tank (license renewal boundary drawing 2-PW-01) as on top of the drain pipe that extends into the primary cooling water storage tank. The clarification was needed because the symbol for the vortex breaker is not included on the "General Notes and Legend" license renewal boundary drawing.

At the same June 10 meeting, the staff also questioned whether pieces of a failed floating diaphragm in the primary water storage tank (license renewal boundary drawing 2-PW-01 at location A3) could enter the tank and prevent the vortex breaker from performing its intended function and/or limit the availability of water for FP purposes. The applicant stated that the diaphragm is metal, and, therefore, is unlikely to break into pieces (documented in the June 10 to 11, 2002, meeting summary dated July 31, 2002). The staff finds the applicant's response to be acceptable on the basis that industry experience has not shown that metal diaphragms or vortex breakers fail in such a manner that impairs the ability of the primary water tank to supply water for its intended function of FP.

License renewal boundary drawing 2-PW-01 at location B3 shows a manway on the primary water storage tank (license renewal boundary drawing 2-PW-01 at location B3). The staff questioned the applicant about why the seals and cover for this manway are not listed in Table 3.3-11 of the LRA as being within the scope of license renewal and subject to an AMR. The applicant stated that the information requested by the staff is contained in Table 3.3-11 on page 3.3-69 and in Appendix C on page C-16 of the LRA. The applicant further stated that loss of mechanical closure integrity is an aging effect associated with bolted mechanical closures that results in failure of the mechanical joint. The manways are evaluated under the AMR for bolting (mechanical closures). The staff finds the applicant's response to be acceptable on the basis that the clarification provided identified that the aging of these bolted closure components will be evaluated in an AMR.

During the review, the staff met with the applicant to request clarification of the description for the components types listed in the LRA. As documented in the summary of the June 10 to 11, 2002, meeting dated July 31, 2002, the applicant explained that manway covers and associated seals, such as that attached to the primary water storage tank (license renewal boundary drawing 2-PW-01 at location B3), are listed in Table 3.3-11 of the LRA as "bolting" (mechanical

closures). The applicant also stated that hose stations in the Unit 2 containment and the Unit 2 fuel handling building are included as component groups "nozzles" and "fittings," shown in Table 3.3-11, and that hose racks are included as component group "component supports (non-safety-related)" in the civil/structural AMR in Section 3.5 of the LRA, and shown in Tables 3.5-2 and 3.5-9 of the LRA.

After completing the initial review, by letter dated July 18, 2002, the staff requested additional information regarding the primary makeup water system. Specifically, the staff questioned the applicant about why the in-scope boundary of the primary makeup water system ends at valves that are shown as normally open (license renewal boundary drawing 2-PW-01 at locations H4 and H5). In Section 2.3.3.11, "Primary Makeup Water," of the LRA, the applicant states that this approach is acceptable because Unit 2 primary makeup water is only required in the event of a fire in the Unit 2 containment or Unit 2 fuel handling building, and the open boundary valves are closed for these fire scenarios. The staff requested that the applicant provide additional information to support the basis for this determination.

The applicant responded to the above questions by letter on October 3, 2002, and stated that valves V15518, V15353, and V15579 are normally open valves. In order to ensure that the flow path for the Unit 2 primary makeup water FP function, these valves are procedurally controlled such that they will be closed, if open, when primary makeup water is required for the hose stations inside the Unit 2 containment. Additionally, even though valve HCV-15-1 is a primary containment isolation valve, it must also be open when primary makeup water is required for the hose stations. Therefore, valve HCV-15-1 is also procedurally controlled such that it is manually opened, if closed, when primary makeup water is required for these hose stations.

The staff finds the applicant's response to be acceptable on the basis that closure (and opening) of the valves described above is controlled by FP procedures which were developed and reviewed by site safety personnel, and are available for inspection by the staff.

The staff's review found that the SCs of the primary makeup water system that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.3.11.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the primary makeup water system components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.3.3.12 Sampling System

In Section 2.3.3.12 of the LRA, the applicant identifies the components of the sampling system that are within the scope of license renewal and subject to an AMR. The system is described in Section 9.3.2 of the Unit 1 UFSAR, and Section 9.3.2 of the Unit 2 UFSAR.

2.3.3.12.1 Technical Information in the Application

The sampling system provides the means to obtain samples from the RCS and auxiliary systems during all modes of plant operation for chemical and radiological analysis. A portion of the sampling system piping penetrates the containment, and, therefore, provides the intended function of containment pressure boundary for both units. Units 1 and 2 sampling system piping that enters and is routed in the EDG building is seismically analyzed to preclude its failure during a seismic event.

The sampling system is in the scope of license renewal because it contains structures or components that are:

- safety-related and are relied upon to remain functional during and following DBEs
- non-safety-related whose failure could prevent satisfactory accomplishment of the intended function of safety-related SCs
- are a part of the EQ Program
- are relied upon during fire events
- that are relied upon during SBO events

In Table 3.3-12 of the LRA, the applicant listed the following sampling system component types as subject to an AMR—valves (pressure boundary only), tubing, fittings, and bolting (mechanical closures). The applicant identified additional pipe/fittings and valves of the sampling system as subject to an AMR in its September 26, 2002, response to RAI 2.1-1 (discussed in Section 2.1 of this SER). The intended function for sampling components subject to an AMR is pressure boundary.

2.3.3.12.2 Staff Evaluation

The staff reviewed Section 2.3.3.12 of the LRA, and the associated license renewal boundary drawings, to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the sampling system that are within the scope of license renewal, in accordance with 10 CFR 54.4(a). The staff then reviewed the AMR results provided in Table 3.3-12 of the LRA to determine whether the applicant appropriately identified the components of the sampling system that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the sampling system that were not listed in Table 3.3-12 to verify, with reasonable assurance, that the applicant properly identified the components that meet the above requirements. The staff also reviewed Section 9.3.2 of the Unit 1 UFSAR, and Section 9.3.2 of the Unit 2 UFSAR, and did not identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were not identified in Section 2.3.3.12 of the LRA.

The staff requested that the applicant clarify several items regarding the sampling system as detailed in the summary of the June 10 to 11, 2002, meeting, dated July 31, 2002. The staff questioned whether samples are taken directly from the low-pressure SI pump discharge header, or from the minflow sample points during the recirculation period following a LOCA. The applicant clarified that the sample lines from the low-pressure SI pump perform no safety-

related functions, and are not credited as part of the post-accident sampling system. The staff finds the applicant's response acceptable on the basis that the applicant properly identified the minflow sample points as the components of the sampling system that perform an intended function and, are therefore, within the scope of license renewal, and subject to an AMR.

The staff also questioned the applicant about whether piping to the containment drain header, shown on license renewal boundary drawings 1-SI-02 at location A2, and drawing 2-SI-02 at location A7, should be within the scope of license renewal, since it appears that the piping penetrates the containment wall in order to reach the containment drain tanks. The applicant stated that the portions of the reactor drain system that penetrate the containment wall are within the scope of license renewal, and that the information is contained on license renewal boundary drawings 1-WM-01and 2-WM-01 for the waste management system. The staff finds the applicant's response acceptable on the basis that the components that perform an intended function are within the scope of license renewal, and subject to an AMR.

The staff's review found that the components of the sampling system that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.3.12.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the sampling system components subject to an AMR, in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.3.13 Service Water (Potable and Sanitary Water)

In Section 2.3.3.13 of the LRA, the applicant identifies the components of the service water system that are within the scope of license renewal and subject to an AMR. The service water systems for Unit 1 and Unit 2 are described in Section 9.2.6, "Potable and Sanitary Water System," of the Unit 1 UFSAR, and in Section 9.2.4, "Service and Potable Water System," of the Unit 2 UFSAR. The service water system is a common-site service for both St. Lucie Units 1 and 2.

2.3.3.13.1 Technical Information in the Application

The service water system, which is a non-safety-related system and serves no safety function, is not required to achieve plant safe shutdown or to mitigate any accidents. The service water system supplies city water to the FP systems, the potable water system, washdown stations, and decontamination facilities. The service water system consists of two pumps, a hydropneumatic tank, and associated piping and valves. The pressure maintenance support function of the service water components is further discussed in Section 2.3.3.6 of the LRA. Failure of this system could prevent satisfactory function of the FP system during a fire event. In addition, for Unit 2, failure of this system within the electrical penetration room in the RAB could result in the failure of safety systems to perform their intended function.

The service water system is within the scope of license renewal because it contains structures or components that are:

- non-safety-related whose failure could prevent satisfactory accomplishment of the intended, functions of safety-related structures or systems, or

- relied upon during fire events.

In Table 3.3-13 of the LRA, the applicant listed the following service water system component types as subject to an AMR: pumps and valves (pressure boundary only), piping, and fittings. The applicant also included the hydropneumatic tank, the domestic water pumps and associated pipe/fittings and valves of the service water system as subject to an AMR in their November 27, 2002, supplemental response to RAI 2.3.3-15 (discussed in Section 2.3.3.6 of this SER). The intended function for service water components subject to an AMR is pressure boundary.

2.3.3.13.2 Staff Evaluation

The staff reviewed Section 2.3.3.13 of the LRA, and the associated license renewal boundary drawings, to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the service water system that are within the scope of license renewal in accordance with 10 CFR 54.4(a). The staff then reviewed the AMR results provided in Table 3.3-13 of the LRA to determine whether the applicant appropriately identified the components of the service water system that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the service water system that were not listed in Table 3.3-13 of the LRA to verify that the applicant properly identified the components that meet the above requirements. The staff also reviewed Section 9.2.6 of the Unit 1 UFSAR, and Section 9.2.4 of the Unit 2 UFSAR to identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.3.3.13 of the LRA.

The staff's review found that the components of the service water system that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.3.13.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the service water system components subject to an AMR in accordance with requirements stated in 10 CFR 54.21(a)(1).

2.3.3.14 Turbine Cooling Water (Unit 1 only)

In Section 2.3.3.14 of the LRA, the applicant identifies the components of the Unit 1 turbine cooling water system that are within the scope of license renewal and subject to an AMR. The turbine cooling water system is described in Section 9.2.4 of the Unit 1 UFSAR. The SBO function of the instrument air compressors cooled by the turbine cooling water system is described in Sections 8.3 and 15.2.13 of the Unit 1 UFSAR.

2.3.3.14.1 Technical Information in the Application

The turbine cooling water system is a closed-loop system used to remove heat from the turbine and other components in the power cycle. A portion of the Unit 1 turbine cooling water system has the intended function of providing a cooling source for instrument air compressors 1A and 1B, which are credited for SBO events. The Unit 2 instrument air compressors are not credited during SBO events.

The applicant stated that some license renewal boundaries of the turbine cooling water system were established at normally open valves. This approach was considered acceptable by the applicant for the turbine cooling water system because the portion of Unit 1 turbine cooling water system that is required for SBO events must be manually isolated, in accordance with plant procedures, to accomplish its SBO function. Therefore, when the system is actually performing its required SBO function, there are no normally open valves at license renewal boundaries.

The Unit 1 turbine cooling water system is in the scope of license renewal because it contains structures or components that are relied on during SBO events

In Table 3.3-14 of the LRA, the applicant identified the following components of the turbine cooling water system that are subject to an AMR: pump and valves (pressure boundary only), tank, cooler, sight glasses, thermowells, piping, and fittings. The intended functions for turbine cooling water components subject to an AMR include pressure boundary and heat transfer.

2.3.3.14.2 Staff Evaluation

The staff reviewed Section 2.3.3.14 of the LRA, and the associated license renewal boundary drawings, to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the Unit 1 turbine cooling water system that are within the scope of license renewal, in accordance with 10 CFR 54.4(a). The staff then reviewed the AMR results provided in Table 3.3-14 of the LRA to determine whether the applicant appropriately identified the components of the Unit 1 turbine cooling water system that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the turbine cooling water system for Units 1 and 2 that were not listed in Table 3.3-14 to verify that the applicant appropriately identified the components that meet the above requirements. The staff also reviewed Sections 8.3, 9.2.4, and 15.2.13 of the Unit 1 UFSAR, and relevant sections of the UFSAR for Unit 2, and did not identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.3.3.14 of the LRA.

During the review, the staff questioned the applicant's omission from Table 3.3-14 of certain passive and long-lived components in the instrument air system, which form the pressure boundary for the turbine cooling water system. By letter dated July 1, 2002, the staff requested that the applicant justify the exclusion of the following components from the scope of license renewal and being subject to an AMR:

- instrument air aftercoolers shown on license renewal boundary drawing, 1-TCW-01, at locations A4, C4, and D4

- jackets for the service air compressor shown on license renewal boundary drawing 1-TCW-01, at location B4.

- instrument air compressors 1A and 1B shown on license renewal boundary drawing 1-TCW-01, at locations B4 and D4.

If these components were included in Table 3.3-14 of the LRA under the "piping/fittings" component group, the staff requested that the applicant clarify why Table 3.3-14 does not list heat transfer as an intended function for these components.

The applicant responded to this RAI by letter dated October 3, 2002. In its response, the applicant stated that the instrument air compressor aftercoolers are addressed as a part of instrument air and listed in Table 3.3-8 of the LRA (pages 3.3-51, 3.3-52, and 3.3-56). The tube side ("Instrument air compressor cooler tubes" component group on page 3.3-51) includes both heat transfer and pressure boundary as intended functions. The applicant considered instrument air compressors 1A and 1B within the scope of license renewal, but not subject to an AMR because they are designated active components, in accordance with the requirements of 10 CFR 54.21(a)(1)(i) and the guidance of NEI 95-10. Instrument air and service air jacket coolers were also placed within the scope of license renewal but were not subject to an AMR. The applicant concluded that these coolers are an integral part of the air compressors and are, therefore, considered active components, in accordance with the requirements of 10 CFR 54.21(a)(1)(i) and the guidance of NEI 95-10.

The applicant also responded that the service air compressor aftercooler was inadvertently omitted from Table 3.3-14 of the LRA. The aftercooler for service air has no heat transfer requirements, but does perform a function of pressure boundary for turbine cooling water. In its response, the applicant revised Table 3.3-14 to include the service air aftercoolers.

The staff finds the applicant's response with regard to the service air compressor aftercoolers to be acceptable because it clarifies that these components are within the scope of license renewal and subject to an AMR, in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively. The staff also agrees that the instrument air compressor itself is considered an active component, in accordance with the requirements of 10 CFR 54.21(a)(1)(i) and the guidance of NEI 95-10.

However, the staff questioned the applicant's conclusion that the instrument air and service air jacket coolers should be considered an integral part of the active instrument air compressor. Given the similarity to valve bodies and pump housings, it appeared that a leak in the water-filled jacket housing could cause a jacket cooler to fail its heat transfer and pressure boundary intended functions. The staff therefore requested that the NRC inspection team verify that the Unit 1 air compressor jacket coolers are integral parts of the instrument air compressors during an on-site scoping and screening audit conducted October 21 through 25, 2002.

As documented in the inspection report dated November 27, 2002, the water-filled jacket cooler (as noted above) consists of concentric cylinders around a piston cylinder. The cooling water enters the water jacket at the top of the cylinders and exits at the bottom. Plant inspection procedures require inspection for the accumulations of foreign matter or scale formations on

the water jackets and water intakes. The NRC inspection verified that the cooling water jackets are an internal part of the compressors and are inspected during preventive maintenance of the compressors. On the basis of the inspection report cited above, the staff finds the applicant's conclusion that the jacket coolers are an integral part of the active instrument air compressor to be acceptable, and therefore, concludes that these jacket coolers are not subject to an AMR.

Also, by letter dated July 1, 2002, the staff requested the applicant to clarify the intended support function of the Unit 1 turbine cooling water system that led to the determination that only the Unit 1 turbine cooling water system is within the scope of license renewal, and to confirm that the Unit 2 turbine cooling water system does not perform a similar intended function.

In its response dated October 3, 2002, the applicant stated that instrument air compressors 1A and 1B are credited during a Unit 1 SBO event because they can be manually loaded onto a vital bus (Sections 8.3 and 15.2.13 of the Unit 1 UFSAR). A portion of Unit 1 turbine cooling water provides the cooling water source for these compressors, and thus is within the scope of license renewal. The Unit 2 instrument air compressors 2A and 2B are not required to address SBO at either unit. Therefore, the Unit 2 turbine cooling water system is not required to perform or support any system intended functions that satisfy the scoping criteria of 10 CFR 54.4(a).

The staff finds the clarification provided in the applicant's response to be acceptable because it agrees with the staff's general understanding of the SBO functions of the Unit 1 turbine cooling water and instrument air systems contained in the UFSAR, and it clarifies the design differences between the two units that led to the determination that the Unit 2 turbine cooling water system has no intended functions that meet the criteria of 10 CFR 54.4(a).

Except as noted above, the staff's review found that the components of the Unit 1 turbine cooling water system that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR in accordance with 10 CFR 54.21(a)(1).

2.3.3.14.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the Unit 1 turbine cooling water system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.3.15 Ventilation

In Section 2.3.3.15 of the LRA, the applicant identifies the components of the ventilation systems that are within the scope of license renewal and subject to an AMR. This system is generally described in Section 6.2.2.2.2 of the UFSARs for St. Lucie Units 1 and 2; additional UFSAR sections are cited as references for the specific ventilation subsystems identified below.

2.3.3.15.1 Technical Information in the Application

Ventilation systems supply HVAC to various buildings, rooms, and areas throughout Units 1 and 2. The ventilation system includes the following subsystems subject to an AMR for both Units 1 and 2—control room air conditioning, emergency core cooling systems (ECCS) area ventilation, RAB electrical and battery room ventilation, RAB main supply and exhaust, and shield building ventilation. The following ventilation subsystems are subject to an AMR for Unit 2 only— fuel handling building ventilation and intake structure ventilation. The miscellaneous ventilation subsystems (separate systems to cool the Unit 1 computer room and hot shutdown panel) are subject to an AMR for Unit 1 only.

The ventilation subsystems subject to an AMR for Units 1 and 2 are different for several reasons:

- The fuel handling building ventilation system is non-safety-related in the current licensing basis for Unit 1, and safety-related at Unit 2. The fuel handling building ventilation system for Unit 2 is considered to be within the scope of license renewal and subject to an AMR because it is safety-related. The Unit 1 fuel handling building ventilation system is not considered to be within the scope of license renewal. The offsite radiological consequences of the design basis FHA for Unit 1 is much less than the limits specified in 10 CFR 100, even with the assumption of a ground level release, therefore, the Unit 1 fuel handling building ventilation system does not perform an intended function that meets the criteria of 10 CFR 54.4(a)(3).

- Protection against vertical missiles was not considered in the Unit 1 design basis, but was required for Unit 2. The Unit 1 intake structure is unroofed. The intake structure for Unit 2 is fully enclosed to prevent damage from vertical missiles. Therefore, a ventilation system was provided to cool the Unit 2 intake pumps.

- The miscellaneous ventilation systems do not exist for Unit 2; the intended functions performed by these systems at Unit 1 are performed by the RAB electrical equipment and battery room ventilation system at Unit 2. The RAB electrical equipment and battery room ventilation system for both units are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

The ventilation system is within the scope of license renewal because its subsystems include structures or components that are:

- safety-related and are relied upon to remain functional during and following DBEs,

- part of the EQ Program,

- relied on during fire events, or

- relied on during SBO events.

The design and intended functions of each of these subsystems will be discussed individually in the remainder of this section of the SER.

Control Room Air Conditioning. The control room ventilation system (CRVS) has the intended functions of maintaining habitability, temperature, and humidity inside the main control rooms for Units 1 and 2. Information regarding the control room air conditioning system is provided in Sections 9.4.1 and 6.4.1 of the UFSARs for Units 1 and 2.

In Section 9.4.1 of the UFSARs, the applicant states that the following control room air conditioning system design bases for both St. Lucie units. The Unit 1 control room air conditioning system design bases are:

- Limit control room doses due to airborne activity to within General Design Criterion (GDC) 19 limits.
- Maintain the ambient temperature required for personnel comfort during normal conditions.
- Permit personnel occupancy and proper functioning of I&C instrumentation and control during all normal and LOCA conditions assuming a single active failure.
- Withstand design basis earthquake loads without loss of function.
- Permit personnel occupancy during a toxic gas release accident.

The following are the system design bases for the Unit 2 control room air conditioning system.

- Control the environment in the control room envelope, for the comfort of control room personnel, and assure the operability of control components during normal plant operation, anticipated operational occurrences, or abnormal occurrences.
- Ensure that no single active failure coincident with a loss of offsite power can result in loss of functional performance.
- Maintain the control room envelope at an average positive pressure of 0.03 kPa (1/8 inch w.g.) above that of the surroundings during normal plant operation and following a LOCA.
- Provide means to limit the introduction of airborne radioactivity, smoke, toxic gases, or steam to the control room envelope.
- Provide air cleaning for the control room envelope atmosphere so that airborne radiological doses experienced by control personnel following a design basis accident (DBA) do not exceed limits imposed by GDC 19.
- Ensure that makeup air brought in during an event that has resulted in control room isolation does not bypass the air cleaning process before it mixes with the control room envelope air.

- Assure that essential portions of the systems and control components are protected against missiles (internal and external) and floods, and are designed to remain functional subsequent to a safe shutdown earthquake.

- Provide accessibility for adjustments, periodic inspections; and testing of the system components to assure continuous functional reliability.

During normal operation, this system draws air from its associated control room, passes the air through air conditioning units, and returns the air to the control room. In addition, outside makeup air is supplied to ensure that a positive pressure is maintained in the control room.

During emergency conditions, outside air is isolated and the control room air is recirculated. A portion of the recirculated control room air is passed through high-efficiency particulate air (HEPA) filters and charcoal adsorbers. Emergency conditions are triggered by (1) receipt of a containment isolation signal (CIS), or (2) receipt of a high radiation alarm on the intake radiation monitors, or (3) loss of power to the intake radiation monitors.

The Unit 1 control room air conditioning system consists of three 50-percent capacity split-system air conditioning units (each having an indoor and outdoor section), a ducted air intake and air distribution system, and a filter train with HEPA filters and charcoal adsorbers with two redundant booster centrifugal fans. The indoor sections are located at Elevation 62 feet and include a cabinet-type centrifugal fan, a direct expansion refrigerant cooling coil and filters. Each of the three outdoor section units is a single assembly which includes a refrigerant condensing coil and fans, and a refrigerant compressor, located on the roof of the adjoining Unit 1 RAB. During normal operation, two of the three air conditioning units are in operation, while the third unit is in standby status.

Control room air is drawn into the indoor air handling section through a return air duct system and roughing filters, and is cooled as required. Conditioned air is directed back to the control room through a supply air duct system. Outside air makeup enters through either of two outside air intakes located in the north and south walls of the RAB.

The control room has three air duct penetrations; two for the outside air intake, and one for the toilet area ventilation and kitchen exhausts. Upon receipt of a CIS from either Unit 1 or 2, or a high radiation signal, the booster fans are automatically started and the charcoal filter train dampers are opened. Outside air intake is isolated by low-leakage redundant dampers located in the outside air makeup ducts. The outside air intake dampers also close upon receipt of a high radiation signal from radiation monitors located in the air intakes. Kitchen and toilet exhaust ducts are also isolated by low-leakage redundant dampers. The control room air is then recirculated through the HEPA filters and charcoal adsorbers.

During post-LOCA operation, the control room air conditioning system maintains a positive control room pressure. The control room filtration system has been modified to increase its dose reduction effectiveness during the post-LOCA operating mode. Flow control dampers installed in each air intake control the flow of air being drawn into the control room. Post-LOCA makeup flow enters through one of these dampers and passes through the charcoal filters. As a result, all makeup air is filtered. Upon loss of offsite power, the air conditioner units are automatically loaded on the EDGs.

The control room air conditioning system for Unit 2 differs from that of Unit 1, which uses direct expansion refrigeration system to cool the air, with three 50-percent capacity refrigerant loops split between indoor and outdoor units. The Unit 2 air conditioners are cooled by the component cooling water system and are located entirely indoors.

In Table 3.3-15 of the LRA, the applicant identifies the component types of the control room air conditioning system that are subject to an AMR. The following component types subject to an AMR were identified for both St. Lucie units—valves, piping/fittings, tubing/fittings, thermowells, filter housings, ducts, orifices, flexible connections, and bolting (mechanical closures). The following components were identified as being applicable for Unit 2 only—control room air conditioner heat exchanger condenser shell, vents, drains, baffles, and support plates; control room air conditioner heat exchanger channel, vents, and drains; and control room air conditioner heat exchanger tubes and tubesheets.

In response to RAI 2.3.3.15-1 from the staff, the applicant revised Table 3.3-15 to add fan and damper housings. Sealant materials used to maintain the positive pressure of the main control room envelope are subject to an AMR as structural components in Tables 3.5-8 and 3.5-12 of the LRA. In Table 3.3-15 of the LRA, the applicant lists the intended functions of the control room air conditioning system components as pressure boundary, heat transfer, or throttling.

Emergency Core Cooling System Area Ventilation System. The ECCS area ventilation system has the post-LOCA intended function of filtration and adsorption of fission products in the exhaust air from areas of the RAB which contain the following equipment—containment isolation valves, high- and low-pressure SI pumps, containment spray pumps, shutdown heat exchangers, and piping which may contain recirculated containment sump water. These components require ventilation to operate properly. The ECCS area ventilation system is discussed in Section 9.4.3 of the UFSARs for Unit 1 and 2.

Redundant safety-related components are served by separate ventilation trains. In this way, failure of a single active ventilation component can affect operation of only one of the redundant safety-related components. Each of the redundant ventilation components and its controls is powered from a separate emergency bus.

During normal operation, the RAB main ventilation supply and exhaust system provides the necessary ventilation of the ECCS pump rooms. Under accident conditions when several or all of the pumps are operating, the air supply to the nonessential section of the RAB is directed to the pump rooms to provide the additional cooling air requirement. Dampers are positioned automatically on a safety injection actuation signal (SIAS) to provide the proper flow path for supply air to the ECCS area. Simultaneously, the exhaust fans are energized and dampers in the exhaust ductwork are positioned to allow the fans to draw all exhaust air from the area through the HEPA and charcoal filter banks before discharge to the atmosphere. (The air exhaust system is comprised of two redundant trains, each having a centrifugal fan, a HEPA and charcoal filter bank, and associated ductwork, dampers and controls). Two ECCS area ventilation system exhaust monitors, connected to the noble gas monitoring system, measure the airborne effluent from the ECCS area.

The system is sized to maintain a slightly negative pressure of between 0.06 - 0.25 kPa (0.25 to 1 inch w.g.) in the ECCS area with respect to surrounding areas of the RAB. Ductwork

transporting air to the filter banks is also at negative pressure. Dampers connecting the ECCS area ventilation system with other parts of the auxiliary building main exhaust and supply systems fail in the closed position upon loss of control air or power. Dampers, which align flow from the area through the charcoal filter train and exhaust fans, fail in the open position.

The applicant lists the component types of the ECCS area ventilation system that are within the scope of license renewal and subject to an AMR in Table 3.3-15 of the LRA. Specifically, the component types include valves, tubing/fittings, thermowells, filter housings, ducts, orifices, flexible connections, and bolting (mechanical enclosures). In response to RAI 2.3.3.15-1 from the staff, the applicant revised Table 3.3-15 to add fan and damper housings. In Table 3.3-15 of the LRA, the applicant lists the intended functions of these items as pressure boundary and throttling.

Fuel Handling Building Ventilation System (Unit 2 Only). The Unit 2 fuel handling building ventilation system has the intended function of preventing the buildup of airborne radioactivity in the fuel handling building and providing ventilation to fuel pool cooling equipment located in the building. As discussed above, only the Unit 2 fuel handling building ventilation system is within the scope of license renewal and subject to an AMR. More detailed information pertaining to the fuel handling building ventilation systems is provided in Section 9.4.6 of the Unit 1 UFSAR and in Section 9.4.2 of the Unit 2 UFSAR. As stated in the Unit 2 UFSAR, the design bases for the fuel handling building ventilation are as follows:

- Direct airflow from areas of low potential radioactivity to areas of progressively higher potential radioactivity; prevent accumulation of airborne radioactivity in the fuel handling building.

- Maintain a negative pressure with respect to outside area when all outside doors are closed.

- Limit offsite effluents from fuel pool area during normal operation by removing airborne radioactive particulates through HEPA filtration.

- Via the bypass through the SBVS, limit the offsite exposures resulting from a FHA to within the limits of 10 CFR 100, assuming a single active failure.

During normal operation, the fuel handling building is ventilated by two supply air systems. Each supply system consists of a hooded wall intake and air handling unit with roughing filters, fan section, and a duct distribution system. One system supplies air to the fuel pool area including the fuel storage area, while the other system supplies air to the balance of the fuel handling building, excluding the HVAC equipment room. The HVAC equipment room is ventilated by a separate exhaust fan. Air exhaust from the fuel handling building equipment area is passed through a prefilter and HEPA filter bank before being discharged by a centrifugal fan to the atmosphere via the fuel handling building vent stack.

The portion of the fuel handling building ventilation system used for SFP ventilation is interconnected with the SBVS (SBVS). Upon receipt of a high-radiation signal from the fuel pool area, the redundant fail closed isolation dampers located at the fuel pool area supply and exhaust penetrations automatically close, and the supply and exhaust fans used for fuel

handling building ventilation under normal operation are de-energized. The normally closed isolation valves in the interconnecting line to the SBVS then open. The fans in the SBVS automatically start and evacuate air from the fuel pool area through the interconnecting line. This air is then passed through the SBVS charcoal and HEPA filters before being discharged through the plant vent stack. Evacuation of the fuel pool area air by the SBVS ensures a negative pressure in that area to preclude unfiltered leakage of radioactivity to the environment.

Although Section 2.3.3.15 of the LRA does not describe the fuel handling building ventilation system for Unit 1, the description provided in Section 9.4.6 of the Unit 1 UFSAR is similar to that of Unit 2, except for interconnecting line to the SBVS.

In Table 3.3-15 of the LRA, the applicant listed the component types of the Unit 2 fuel handling building ventilation system that are within the scope of license renewal and subject to an AMR. Specifically, the component types include valves, tubing/fittings, ducts, flexible connections, and bolting (mechanical enclosures). In response to RAI 2.3.3.15-1 from the staff (discussed below), the applicant revised Table 3.3-15 to add damper housings. The intended function of the fuel handling building ventilation system components listed in Table 3.3-15 is pressure boundary.

Intake Structure Ventilation (Unit 2 only). The intake structure ventilation system for Unit 2 has the intended function of cooling the safety-related intake pumps, located in the enclosed St. Lucie Unit 2 intake structure. The Unit 1 intake structure is unroofed and open to the weather and does not require a forced ventilation system. More detailed information pertaining to the intake structure ventilation system is provided in Section 9.4.6 of the Unit 2 UFSAR.

The Unit 2 intake structure ventilation system consists of two redundant 100-percent capacity propeller exhaust fans, two pressure dampers and two screened openings. The air drawn through the screened openings is exhausted by the fans to the atmosphere. Normally, one of the fans is operated, as necessary, to maintain the temperature of the ICW pump room at less than 49 ^{o}C (120 ^{o}F). Missile protection and pressure dampers are provided in the exhaust opening to protect the exhaust fans from external missiles and excessive wind conditions.

Although the applicant categorized this system as within the scope of license renewal, all of the components of this system shown as within the scope of license renewal (on license renewal boundary drawing 2-HVAC-1 at location F5) are either considered active, in accordance with 10 CFR 50.21(a) and the guidance given in NEI 95-10, or do not have an intended function that meets the scoping criteria of 10 CFR 54.4(a). Therefore, the Unit 2 intake structure ventilation system does not have any components listed in Table 3.3-15 that are within the scope of license renewal and subject to an AMR.

Miscellaneous Ventilation (Unit 1 only). As defined in Section 2.3.3.15 of the LRA, the miscellaneous ventilation systems provide ventilation for the Unit 1 computer room and hot shutdown panel room. These systems are not described in the Unit 1 UFSAR, however, the components of the miscellaneous ventilation systems are shown in license renewal boundary diagrams, 1-HVAC-01 and 1-HVAC-02. The Unit 2 RAB (RAB) electrical equipment and battery room ventilation system provides ventilation for the Unit 2 hot shutdown panel and computer room; this system.

Should an emergency condition cause the control room to be abandoned, local emergency I&C are provided at the hot shutdown panel to enable the operator to maintain the unit at hot shutdown conditions from outside the control room. Section 7.4.1.8 of the Unit 1 UFSAR provides further information concerning the hot shutdown panel, but does not discuss cooling of the hot shutdown panel room. As shown on license renewal boundary drawing, 1-HVAC-01, the Unit 1 hot shutdown panel room is ventilated by a system consisting of an outside air intake, a supply fan (HVS-9) and prefilters packaged in a single housing, a motor-operated damper upstream of the fan unit, an exhaust fan (HVE-35) mounted in the wall and exhausting to the atmosphere, and associated ductwork.

As shown in license renewal boundary drawing, 1-HVAC-02, the Unit 1 computer room is ventilated by supply air consisting of air recirculated back from the computer room, mixed with air diverted from the technical support center supply air (which is supplied by the CRVS). Redundant supply fan units, HVA-10A and B (shown on drawing 1-HVAC-02 at locations C8 and D8), each consisting of a fan and prefilters packaged in a single housing, provide air to the computer room. Motor-operated dampers are located upstream and downstream of each fan unit. The computer room ventilation system is entirely within the control room envelope.

The applicant listed the Unit 1 component types of the miscellaneous ventilation systems that are within the scope of license renewal and subject to an AMR in Table 3.3-15. Specifically, the component types include filter housings, flexible connections, and bolting (mechanical enclosures). In response to RAI 2.3.3.15-1 from the staff (discussed below), the applicant revised Table 3.3-15 to add damper housings. The intended function of these components listed in Table 3.3-15 is pressure boundary.

RAB Electrical and Battery Room Ventilation System. The Units 1 and 2 RAB (RAB) electrical and battery room ventilation systems are safety-related since they are required for proper functioning of the emergency electrical distribution equipment. More detailed information regarding these systems is provided in Sections 9.4.2.2.2 of the Unit 1 UFSAR, and Section 9.4.3.2.2 of the Unit 2 UFSAR.

For Unit 1, electrical equipment rooms 1A, 1B, and 1C; the static inverter room; and battery rooms 1A and 1B are ventilated by an air supply subsystem and individual room exhaust fans. Air is supplied through a louvered intake, filters, two centrifugal supply fans operating in parallel, and a duct distribution system. Equipment room 1A is exhausted by two power roof ventilators, while equipment rooms 1B and 1C and the static inverter room are exhausted through-wall fans. Equipment room 1C is also provided with supplemental cooling from two non-safety-related air conditioning units. Battery rooms 1A and 1B are exhausted by power roof ventilators. All of these components are operating under normal conditions.

Upon loss of offsite power, the electrical equipment room supply fans and the battery room exhaust fans are automatically connected to the EDGs. The electrical equipment room exhaust fans are manually restarted by administrative control and are powered by separate emergency busses, as are the battery room exhaust fans. The supply fans are similarly powered by separate busses.

During normal operation, with one non-safety grade air conditioner and all supply and exhaust fans operating, the ventilator air flow rates for the electrical equipment rooms, static inverter

room, and battery rooms are selected to maintain a temperature of less than 40 °C (104 °F), with the outside air temperature at 34 °C (93 °F). In the event both air conditioners are not in operation, the ventilator air flow rates are sufficient to maintain all the rooms at less than 40 °C (104 °F). With one supply fan and one air conditioner operating, the supply fan operates at two-thirds the capacity of two supply fans, sufficient to maintain all rooms below 40 °C (104 °F).

During an emergency condition that involves a loss of offsite power, the automatic restart of the battery room exhaust fans and the electrical equipment room supply fans ensures that temperatures will not exceed 49 °C (120 °F) in any of the rooms.

For Unit 2, the following differences from Unit 1 are observed (1) upon loss of offsite power, the entire system is automatically connected to the EDGs, unlike Unit 1, where the electrical equipment room exhaust fans are manually restarted, (2) ventilator air flow rates for the for the electrical equipment, static inverter, and battery rooms are selected to maintain a temperature of less than 43 °C (110 °F), with an outside air temperature of 34 °C (93 °F), and (3) the Unit 2 hot shutdown cubicle is cooled by the RAB electrical and battery room ventilation systems, while the Unit 1 hot shutdown panel room is cooled by a portion of the Unit 1 miscellaneous ventilation system.

The applicant identified the component types that are within the scope of license renewal and subject to an AMR in Table 3.3-15 of the LRA. Specifically, the following component types include shell for HVS-5A and B plenum and filters (Unit 1 only), internal structural supports for HVS-5A and B plenum and fans, filter holding frames, ducts, flexible connections, thermowells, tubing/fittings, bolting (mechanical enclosures). In response to RAI 2.3.3.15-1 from the staff (discussed below), the applicant revised Table 3.3-15 to add fan and damper housings. The intended function of these items is also listed in Table 3.3-15 as pressure boundary and structural support.

RAB Main Supply and Exhaust System. The RAB main supply and exhaust system performs the intended function of supplying air to the ECCS pump rooms, shutdown cooling heat exchanger rooms, penetration areas, and to nonessential areas of the RAB. The RAB main supply and exhaust system is discussed in Sections 9.4.2.2.1 and 9.4.3.2.1 of the UFSARs for St. Lucie Units 1 and 2, respectively.

The RAB main supply and exhaust system consists of a redundant air supply system and a redundant air exhaust system. The air supply flows through wall louvers, roughing filters, two 100-percent capacity centrifugal fans, and associated duct distribution systems. Under loss of normal power, the supply fans are automatically connected to the EDG set, and each fan is powered from a separate bus. The air exhaust system includes a 100-percent capacity bank of prefilters and HEPA filters, two 100-percent capacity exhaust fans, and duct exhaust systems. Exhaust air is discharged through the plant vent stack.

Under normal operation, the RAB main supply and exhaust system provides the necessary ventilation of the ECCS pump rooms. Under accident conditions when several or all of the ECCS pumps are operating, the air supply to the nonessential section of the RAB is directed to the pump rooms to provide additional cooling. Dampers are positioned automatically to provide the proper flow path for supply air to the ECCS area. Simultaneously, the ECCS area ventilation system exhaust fans are automatically energized, and dampers in the exhaust

ductwork of that system are automatically positioned to allow the fans to draw all exhaust air from the areas through the HEPA and charcoal filter bank before discharge to the atmosphere. (The ECCS area ventilation system is discussed above.) Under accident conditions, the air from the ECCS pump rooms is exhausted by the ECCS area ventilation system, and not the RAB main supply and exhaust system; therefore, the exhaust portion of the latter system is not safety-related.

The applicant lists the component types of the RAB main supply and exhaust system that are within the scope of license renewal and subject to an AMR in Table 3.3-15 of the LRA. Specifically, the following components types include shell (housing) for HVS-4A and 4B plenum and filters, internal structural supports for HVS-4A and 4B plenum and fans, filter holding frames, ducts, flexible connections, thermowells, tubing/fittings, and bolting (mechanical closures). In response to RAI 2.3.3.15-1 from the staff (discussed below), the applicant revised Table 3.3-15 to add damper housings. The intended functions of the RAB main supply and exhaust system components listed in Table 3.3-15 are pressure boundary and structural support.

Shield Building Ventilation System. The SBVS has the intended functions of (1) limiting the pressure rise in the shield building annulus following a LOCA so as not to exceed the shield building internal design pressure, (2) maintaining a small sub-atmospheric pressure in the shield building annulus of each unit following a LOCA to ensure that offsite doses resulting from post-accident leakage from the containment are reduced by routing through the shield building filters, and (3) providing fission product removal capacity to reduce the offsite doses resulting from post-accident leakage from the containment. The SBVS is discussed in Section 6.2.3 of the UFSARs for St. Lucie Units 1 and 2.

The SBVS consists of two full-capacity redundant fan and filter subsystems which share a common shield building duct intake and a common plant vent. Each filter subsystem consists of demisters, electric heating coils, and HEPA filters and charcoal adsorbers enclosed in a common casing. The annulus air intake consists of a ring duct with inlets at approximately Elevation 62 feet located at each quadrant and at the top of the shield building. Two separate 76-cm (30-inch) diameter lines from the ring duct penetrate the shield building walls to connect to their corresponding filter subsystems. The fan and filter subsystems are located in the RAB. Outside air lines, 168 cm^2 (26 in^2), each isolated by a check valve and a motor operated valve in series, are connected to the intake of the filter subsystems to provide cooling air to the filters when required. A 30.5 cm (12-inch) line with an isolating butterfly valve cross connects the filter subsystems downstream of the filter banks and upstream of the fans to maintain flow through the filters in the event of failure of a fan. A gravity damper is located at the discharge of each fan to prevent loss of capacity of an operating fan due to recirculation through an inactive system.

After a LOCA, the temperature expansion of the containment vessel and the heat transfer through the vessel walls to the annulus result in a decrease in the shield building volume and an increase in annulus pressure. This pressure increase is rapidly drawn down by operation of the SBVS. The motorized dampers downstream of the fans are normally open. Upon receipt of a containment isolation actuation signal, the fans are in full operation in 10 seconds, assuming offsite power is available. Upon a coincident loss of offsite power, the fans receive a start signal but are not actuated until they are loaded onto the DGs. Once started, the fan exhaust

rate reduces as draw down to negative pressure proceeds. The fan continues exhausting air at a decreasing rate, until the pressure in the shield building is 0.5 kPa (2 inch w.g.) negative with respect to atmospheric, as sensed by a pressure differential transmitter. At this point, a motorized damper at the discharge of the fan closes to a pre-set position to throttle air flow to the continuous rated system flow of 2.8 m^3/s (6000 cubic feet per minute (cfm)). As the shield building annulus becomes evacuated and the heat transfer rate from the containment stabilizes, the amount of outflow from the annulus is essentially balanced by shield building in-leakage.

The Unit 1 SBVS is interconnected to the hydrogen purge system. The Unit 2 SBVS is similarly interconnected to the continuous containment/hydrogen purge system.

The applicant listed the component types of the SBVS that are within the scope of license renewal and subject to an AMR in Table 3.3-15 of the LRA. Specifically, the components types include valves, tubing/fittings, thermowells, piping, filter housings, demisters, flexible connections, ducts, and bolting (mechanical closures). In response to RAI 2.3.3.15-1 from the staff (discussed below), the applicant revised Table 3.3-15 to add fan damper housings. The intended functions of the SBVS components listed in Table 3.3-15 are pressure boundary and moisture removal.

2.3.3.15.2 Staff Evaluation

The staff reviewed Section 2.3.3.15 of the LRA, and the associated license renewal boundary drawings, to determine whether there is reasonable assurance that the applicant adequately identified the components of the ventilation system that are within the scope of license renewal, in accordance with 10 CFR 54.4(a). The staff then reviewed the AMR results provided in Table 3.3-15 of the LRA to determine whether the applicant adequately identified the components belonging to the ventilation system that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the ventilation system that were not listed in Table 3.3-15 to verify that the applicant properly identified the components that meet the above requirements. The staff also reviewed Section 6.2.2.2.2 and other relevant sections of the Units 1 and 2 UFSARs, and did not identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.3.3.15 of the applicant's LRA.

After the staff's initial review, certain issues common to all of the ventilation subsystems were identified and grouped into three general RAIs. These issues pertain to fan and damper housings, filter media, and other components that the applicant did not identify as being subject to an AMR. The license renewal boundary drawings supplied by the applicant for the ventilation systems show various dampers and fans as being within the scope of license renewal. However, Table 3.3-15 of the LRA does not include the housings for the dampers and fans. By letter dated June 18, 2002, the staff requested that the applicant either include these housings in Table 3.3-15, or justify their omission (RAI 2.3.3.15-1). This RAI identifies 172 fan and damper housings and the corresponding license renewal boundary drawing locations where they are shown.

By letter dated October 3, 2002, the applicant responded that, based on the staff's position on previous LRAs, as well as staff expectations expressed at prior meetings, fan and damper housings have now been included as subject to an AMR for applicable ventilation systems.

Revised versions of Table 3.3-15 with appropriate additions were provided for the following subsystems with fan and damper housings—control room air conditioning, ECCS area ventilation, Unit 2 fuel handling building ventilation, Unit 1 miscellaneous ventilation, RAB electrical and battery room ventilation, RAB main supply and exhaust, and shield building ventilation.

The staff considers the applicant's response to RAI 2.3.3.15-1 acceptable on the basis that the applicant has included the fan and damper housings for the applicable ventilation subsystems as within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

The license renewal boundary drawings provided by the applicant for ventilation subsystems show various system filters as being within the scope of license renewal. However, Table 3.3-15 of the LRA does not identify the filter media as subject to an AMR, nor does it provide a justification for their exclusion. System filters are passive and may be long-lived, and as such are within the scope of license renewal and subject to an AMR. Media for system filters may be excluded from being subject to an AMR if they are replaced periodically, or routinely replaced dependent on condition. In such cases, the applicant should specify the basis for the exclusion of filter media and describe the plant-specific monitoring program and the performance standards and criteria for replacement. In a letter dated July 18, 2000, the staff requested that the applicant justify the omission of the filter media (RAI 2.3.3.15-2). The RAI identifies 33 system filters and the corresponding license renewal boundary drawing locations where they are shown.

By letter dated October 3, 2002, the applicant identified those filters where media are replaced periodically in accordance with plant procedures on intervals ranging from monthly to 13 weeks. Also identified were HEPA and charcoal filters where media are tested and replaced in accordance with the St. Lucie Technical Specifications that define specific performance standards and criteria. The applicant identified the specific technical specifications in the response.

The staff considers the applicant's response to this RAI acceptable on the basis that the filter media identified in the RAI are either replaced periodically (with replacement intervals specified) or routinely replaced on their condition, in accordance with technical specifications which define specific performance standards and criteria. Therefore, all of the filter media identified in RAI 2.3.3.15-2 are excluded from being subject to an AMR in accordance with 10CFR 54.21(a)(1)(ii).

The license renewal boundary drawings provided by the applicant for the ventilation subsystems show the following various components as being within the scope of license renewal, but not listed in Table 3.3-15 as being subject to an AMR:

- intake screen for hot shutdown panel ventilation outside air inlet (Unit 1)
- direct expansion cooling coils and coil housings located in the CRVS (Units 1 and 2)
- electrical heating coils and housings located in the SBVS (Units 1 and 2)

- demister housings located in the SBVS (Units 1 and 2)

- screened openings and associated intake structure ductwork (Unit 2)

In a letter dated July 18, 2002, the staff requested that the applicant justify the omission of these components from Table 3.3-15 (RAI 2.3.3.15-3). The applicant's response to this RAI will be addressed below in the staff evaluation of the individual ventilation subsystems in which these components are located.

Control Room Ventilation System Staff Evaluation. After completing the initial review of the CRVS, in a letter dated July 18, 2002, the staff requested that the applicant describe the main control room envelope (MCRE) for Units 1 and 2, and verify that all CRVS components that are relied upon to perform a safety-related function, and are passive and long-lived, are identified in the LRA as being within the scope of license renewal and subject to an AMR (RAI 2.3.3.15-5).

By letter dated October 3, 2002, the applicant responded by identifying the areas which are included in the MCRE for Units 1 and 2. In addition, the applicant stated that all Unit 1 and Unit 2 control room air conditioning components are safety-related and within the scope of license renewal with the exception of the toilet and kitchen exhaust fans which are isolated under emergency conditions. Those components which are passive and long-lived are subject to an AMR and are listed in Table 3.3-15, as amended by the responses to RAIs 2.3.3.15-1 and 2 discussed earlier.

The staff considers the applicant's response to RAI 2.3.3.15-5 to be acceptable on the basis that the applicant has defined the MCRE for both Units 1 and 2 and has included in Table 3.3-15, as verified by the staff, all components of the control room air conditioning system which are within the scope of license renewal and are subject to an AMR.

The staff review identified several components which are highlighted as being within the scope of license renewal on the license renewal boundary drawings, but are not listed in Table 3.3-15. These include the Unit 1 direct expansion cooling coils and coil housings for indoor HVAC Units HVA-3A, 3B, and 3C, and the Unit 2 direct expansion cooling coils and coil housings for HVAC Units 2HVA/ACC-3A, B, and C. In a letter dated July 18, 2002, the staff requested that the applicant justify the omission of these components from Table 3.3-15 (RAI 2.3.3.15-3).

The staff's review also found that license renewal boundary drawing 1-HVAC-02 (for Unit 1) and Table 3.3-15 do not identify the following components as being within the scope of license renewal—the piping, valves, and flexible connections in the refrigerant lines to and from the outdoor air conditioner compressor units, ACC-3A, ACC-3B, and ACC-3C, to the corresponding indoor air conditioner units, HVAC-3A, HVAC-3B, and HVAC-3C (locations A7, B7, C7). These components should be within scope because they support the intended function of the CRVS to comply with the requirements of GDC 19. In a letter dated July 18, 2002, the staff requested that the applicant provide justification as to why these components are considered outside the scope of license renewal and not subject to an AMR (RAI 2.3.3.15-7).

By letter dated October 3, 2002, the applicant responded to RAIs 2.3.3.15-3 and 2.3.3.15.7 by stating that FPL's screening methodology treats components that are associated with the

refrigeration process (such as the above mentioned components) as active components that are, therefore, not subject to an AMR. The applicant also stated that this conclusion is consistent with that accepted by the staff as part of the Turkey Point Units 3 and 4 LRA review. The applicant's conclusion is based on the rationale that direct expansion refrigeration units (packaged or split) typically consist of refrigerant compressors, condensers, evaporators, expansion valves, economizers and copper tubing, compressor motors, condenser fan motors, and controls. These components are linked together by interconnecting piping, forming the refrigerant circuit. Deteriorating conditions in any of these components will cause the units to either trip or noticeably subperform. Thus, any detrimental effect of aging mechanisms on the refrigerant circuit components is translated to a change in the monitored operational performance of the units. Typically, condensing units are replaced as an integral unit in lieu of individual component repairs. Operability of these refrigeration units is addressed in the St. Lucie Technical Specifications. On this basis, the applicant considers all the components in the refrigerant loop as active.

As part of the its consideration of the applicant's response to the RAIs 2.3.3.15-3 and 2.3.3.15-.7, the staff requested that the inspection team confirm that the control room air conditioning system direct expansion refrigerant loops are maintained as a single integral unit during the site scoping and screening audit held October 21 through 25, 2002. As documented in Inspection Report 2002-07, dated November 27, 2002, the inspector reviewed maintenance records (PCM021-195) for the Unit 1 main control room air conditioning system direct expansion refrigerant cooling units associated with air handling units HVAC-3A, 3B, and 3C, including components located outdoors (ACC-3A, 3B, and 3C) and verified that the components in the refrigerant loop are replaced together. The inspector also reviewed the St. Lucie Unit 1 electrical maintenance procedure for the preventative maintenance of the control room air conditioning units HVA/ACC 3A, 3B, and 3C (1-EMP-25.08) and verified that the components in the refrigerant loop are serviced together, whenever any of the components in the loop are serviced.

With regard to RAI 2.3.3.15-7 and the applicable portion of RAI 2.3.3.15-3, the staff finds the applicant's conclusion to be acceptable; the components in the Unit 1 control room air conditioning refrigeration loops can be considered active on the basis that (1) these units are subject to performance monitoring and their operability is addressed in the technical specifications, (2) a deteriorating condition in any of these components resulting from aging would cause the unit to trip or cause degraded performance, at which point repair or replacement would be effected, and (3) as verified during the scoping and screening inspection, the components in the refrigerant loops are treated as an integral unit and are serviced together whenever any of the components in the loop are serviced.

ECCS Area Ventilation Staff Evaluation. The staff's review of the ECCS area ventilation and other systems indicated that many symbols used for HVAC system components in the license renewal boundary drawings were not defined on the "General Notes and Legend," Drawings 1-NOTES-1 and 2-NOTES-1. For the ECCS area ventilation system in particular, the components downstream of exhaust fans HVE-9A and B (drawing 1-HVAC-02, locations D-5 and E-5) could not be identified. By letter dated July 18, 2002, the staff requested that the applicant identify the subject components (RAI 2.3.3.15-4).

By letter dated October 3, 2002, the applicant responded that the components referred to in the RAI are flow monitors and isokinetic sampling devices. It was further stated that these components do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10CFR 54.4(a).

The staff considers the applicant's response to be acceptable on the basis that these components do not perform any license renewal system intended function, and that failure of these components would not prevent or impair the ECCS area ventilation system from performing its intended function in accordance with 10 CFR 54.4(a)(2).

Fuel Handling Building Ventilation Staff Evaluation (Unit 2 only). After completing the initial review of the Unit 2 fuel handling building ventilation system, the staff reviewed the basis for exclusion of the Unit 1 fuel handling building ventilation system. Section 9.4.2 of the Unit 1 UFSAR states that the offsite doses resulting from an analysis of the FHA (as shown in Table 15.4.1-5 of the UFSAR) are considered acceptably low. The consequences of an FHA are much less than the limits specified in 10 CFR 100, even with the assumption of a ground level release. In addition, as discussed in Section 9.4.6 of the UFSAR for St. Lucie Unit 1, the staff required that a single charcoal bed filter downstream of the HEPA filters in the fuel pool exhaust area be installed. This modification was completed prior to the initial transfer of spent fuel from the Unit 1 containment. The purpose of this filter is to remove elemental iodine.

Because the charcoal filter, as well as the rest of the fuel handling building ventilation system for Unit 1, was not considered to be within the scope of license renewal in the LRA, the staff requested that the applicant provide justification as to why the SCs of the Unit 1 system are considered outside the scope of license renewal and not subject to an AMR by letter dated July 18, 2002 (RAI 2.3.3.15-8).

By letter dated October 3, 2002, the applicant responded that, as documented in Sections 9.4.6 and 15.4.1 of the Unit 1 UFSAR, the fuel handling ventilation system is not relied on nor credited in the safety analysis for FHAs. As such, the system does not perform or support any license renewal system intended functions that satisfy the scoping requirements of 10 CFR 54.4(a). Therefore, components of the Unit 1 fuel handling ventilation system are not within the scope of license renewal or subject to an AMR.

The staff considers the applicant's response to this RAI acceptable on the basis that the Unit 1 fuel handling building ventilation system and its components are not relied upon to limit the radiological release from an FHA to meet the requirements of 10 CFR 100, and thus do not perform an intended function that meets the criteria of 10 CFR 54.4(a)(1)(iii). In addition, none of the components of this system are relied upon to demonstrate compliance with NRC regulations for FP, EQ, PTS, ATWS, and SBO. As a result, the staff concurs with the applicant's position that the Unit 1 fuel handling building ventilation system and its components can be excluded from the scope of license renewal.

Intake Structure Ventilation Staff Evaluation (Unit 2 only). As discussed above, certain issues common to all of the ventilation subsystems were identified and grouped into three general RAIs. The issues pertaining to the omission of fan and damper housings from Table 3.3-15 applied, in part, to the intake structure ventilation system for Unit 2. On license renewal boundary drawing 2-HVAC-01, the housings for the intake structure exhaust fans, 2HVE-41A

and 41B, are shown at location F5, and the housings for the unlabeled intake structure pressure dampers, are also shown at location F5. In a letter dated June 18, 2002, the staff requested that the applicant either include these housings in Table 3.3-15, or justify their omission (RAI 2.3.3.15-1).

By letter dated October 3, 2002, the applicant responded to RAI 2.3.3.15-1. In the portion of its response that pertains to the intake structure ventilation fan and damper housings, the applicant stated that the intake structure fans, 2HVE-41A and 2HVE-41B, are mounted in the roof of the ICW pump enclosure, and thus do not have housings. Similarly, the intake structure ventilation dampers are mounted in the wall of the intake structure, and thus do not have housings.

The staff considers the applicant's response to the portion of RAI 2.3.3.15-1 that pertains to the intake structure ventilation system to be acceptable on the basis that these components do not have housings, but are mounted directly on the intake structure. These structures are identified as within the scope of license renewal and subject to an AMR in Section 2.4.2.10 of the LRA.

During the course of the review, the staff observed that screened openings and associated intake structure ductwork (as identified in Section 9.4.6.2 of the Unit 2 UFSAR) were not listed in Table 3.3-15 as subject to an AMR. Since these components are passive, long-lived, and part of a safety-related system, it was the staff's conclusion that these components may be within the scope of license renewal and subject to an AMR. In a letter dated July 18, 2002, the staff requested that the applicant justify why these components were excluded from the scope of license renewal (RAI 2.3.3.15-3).

By letter dated October 3, 2002, the applicant responded that the subject screens, which are associated with the exhaust dampers, are provided for personnel safety only and have no impact on system operation. Furthermore, the only ductwork in the system is on the discharge side of the exhaust fans and is located outside the pump room on the roof of the intake structure. As such, these components do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10CFR 54.4(a).

The staff considers the applicant's response to this RAI to be acceptable on the basis that, since these components do not perform or support any system intended function, any degradation of these components resulting from aging will not prevent or impair the functioning of the Unit 2 intake structure ventilation system.

Miscellaneous Ventilation Staff Evaluation (Unit 1 only). The staff reviewed the LRA and searched the UFSAR for St. Lucie Unit 1, but was unable to locate additional descriptive information for this system, other than the single sentence provided in LRA Section 2.3.3.15. This sentence identifies that the miscellaneous ventilation systems provide ventilation for the Unit 1 computer room and hot shutdown panel. License renewal boundary drawing, 1-HVAC-02 (locations C8, D8), shows a ventilation supply line from the CRVS to the computer room. By letter dated July 18,2002, the staff requested that the applicant clarify why the computer room ventilation for Unit 1 is considered to be a separate subsystem under "Miscellaneous Ventilation" (RAI 2.3.3.15-6).

By letter dated October 3, 2002, the applicant responded that the CRVS provides only supply air to ventilate the computer room. Computer room ventilation is treated as a separate subsystem because its only intended function is to provide cooling for the computer room, which is within the control room envelope.

The staff considers the applicant's response to this RAI to be acceptable on the basis that treatment of the computer room ventilation system as separate, and not part of the CRVS, is an administrative issue and does not impact the identification of components that are within the scope of license renewal and subject to an AMR.

As discussed above, the staff questioned why several components were not listed in Table 3.3-15 of the LRA. A portion of the Unit 1 miscellaneous ventilation systems supply cooling for the hot shutdown panel, which is required to meet the Commission's FP regulations f(10 CFR 50.48). Components required to perform this intended function are within the scope of license renewal, in accordance with the criteria of 10 CFR 54.4(a)(2). By letter dated July 18, 2002, the staff requested, in part, that the applicant justify the omission of the intake screen for the hot shutdown panel ventilation outside air inlet (RAI 2.3.3.15-3).

The applicant's response to RAI 2.3.3.15-3 stated that the intake screen is actually mounted in a concrete plenum on the south side of the Unit 1 RAB, at plant Elevation 26 feet 10 inches. The actual air intake for the fan is near the top of the plenum, at Elevation 53 feet 8 inches. Due to this large elevation difference, failure of the intake screen would have no impact on the operation of the system. This screen does not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4(a), and thus is not within the scope of license renewal.

The staff found the applicant's response to the portion of RAI 2.3.3.15-3 that relates to the Unit 1 miscellaneous ventilation system to be acceptable on the basis that the physical layout of the ventilation inlet makes it unlikely that the ventilation capability will be significantly impacted by blockage of the screen. The vent inlet is downward facing, and has a short through-wall section which opens onto a concrete plenum. The opening is too big to be credibly blocked by debris. The concrete plenum rises several feet before the opening to the hot shutdown panel ventilation intake. Any leaves and debris that enter the vent will most likely fall to the bottom of concrete plenum, and not block the flow path to the hot shutdown panel.

RAB Electrical and Battery Room Ventilation Staff Evaluation. During the initial review, the staff could not determine from the information contained in the LRA, the UFSAR, and the license renewal boundary drawings provided by the applicant which ventilation system supports and cools the Unit 2 hot shutdown panel and computer room. As a result, in a letter dated July 18, 2002, the staff requested that the applicant identify the system in question and clarify whether this system is within the scope of license renewal and subject to an AMR (RAI 2.3.3.15-9).

By letter dated October 3, 2002, the applicant responded that the Unit 2 RAB electrical equipment and battery room ventilation system provides ventilation to the hot shutdown panel and the computer room, and that this system and its components are within the scope of license renewal and listed in Table 3.3-15 of the LRA. The staff considers the applicant's response to this RAI to be acceptable on the basis that the applicant clarified that the

components associated with the hot shutdown panel and computer room are listed in Table 3.3-15 as subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1).

RAB Main Supply and Exhaust Staff Evaluation. The staff has reviewed Section 2.3.3.15 of the LRA and Sections 9.4.2.2.1 and 9.4.3.2.1 of the UFSARs for St. Lucie Units 1 and 2, respectively. This review confirmed that the applicant has identified all components of the RAB main supply and exhaust system that are within the scope of license renewal and subject to an AMR, in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1). Based on this review, the staff finds that all components of this system that are within the scope of license renewal and subject to an AMR have been identified and are included in Table 3.3-15 of the LRA.

Shield Building Staff Evaluation.

During the initial review of the SBVS, the staff found that certain components shown on the license renewal boundary drawings (cited below) as within the scope of license renewal were not listed as being subject to an AMR in Table 3.3-15. These components include electrical heating coils and housings for Unit 1 (locations D6, F6 on 1-HVAC-02) and Unit 2 (locations D3, D4, F3 on 2-HVAC-03), and demister housings for Unit 1 (locations D6, F6 on 1-HVAC-02) and Unit 2 (locations D3, F6 on 2-HVAC-03). By letter dated July 18, 2002, the applicant was requested, in part, to justify the omission of these components from Table 3.3-15 (RAI 2.3.3.15-3).

By letter dated October 3, 2002, the applicant responded that heating coils, being electrical components, are evaluated in LRA Section 2.5, while the housings for these coils are listed in Table 3.3-15 of the LRA under the component group “filter housings.” Additionally, the applicant stated that demister housings are also included in the table under the component group “filter housings.”

The staff considers the applicant’s response to the applicable portions of this RAI to be acceptable on the basis that the applicant clarified that electrical heating coil housings and demister housings are within the scope of license renewal and are subject to an AMR, and have been included in Table 3.3-15, in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

The staff review found that the components of the ventilation system that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as within the scope of license renewal, and are subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.3.15.3 Conclusion

Based on this review and additional information submitted by the applicant in response to the RAIs, the staff did not identify any omissions. The staff, therefore, concludes that there is reasonable assurance that the applicant has appropriately identified the ventilation system components subject to an AMR, in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.3.16 Waste Management

In Section 2.3.3.16 of the LRA, the applicant identifies the components of the waste management system that are within the scope of license renewal and subject to an AMR. This system is described in Sections 9.3.3, 11.2.2, 11.3.2, and 11.5.2 of the Unit 1 UFSAR, and in Sections 9.3.3, 11.2.2, 11.3.2, and 11.4.2 of the Unit 2 UFSAR. Protection against internal flooding of safety-related equipment is discussed in Appendix 3D of the Unit 1 UFSAR and Appendix 3.6F of the Unit 2 UFSAR.

2.3.3.16.1 Technical Information in the Application

The waste management system collects, monitors, and processes potentially radioactive reactor plant wastes prior to release or removal from the plant site. Waste management includes three subsystems, liquid, gaseous, and solid waste management. The waste management system also includes the safeguards pump room drains and equipment and floor drainage system.

Portions of the waste management system that form part of the containment and safeguards room boundary are within the scope of license renewal. These components generally have the intended function of containment pressure boundary, but other specific components are also included within the scope of license renewal because they have an FP intended function. For example, a segment of piping and an orifice in the Unit 1 RAB blowdown tank hallway that come from the hydrogen supply manifold (shown on drawing 1-WM-03 at location B6) are within the scope of license renewal and subject to an AMR. This piping segment and orifice have an FP intended function.

The waste management system is in the scope of license renewal because it contains the following SCs:

- safety-related and are relied upon to remain functional during and following DBEs,
- non-safety-related whose failure could prevent satisfactory accomplishment of the functions of safety-related SCs,
- part of the EQ Program, or
- relied on during fires.

Consistent with the method described in Section 2.1, “Scoping and Screening Methodology,” of the LRA, the applicant listed the mechanical component types of the waste management system that are subject to an AMR in Table 3.3-16 of the LRA. Specifically, the applicant identified the following component types as subject to an AMR—valves (pressure boundary only), strainers, orifices, piping, and fittings. As discussed in Section 2.1 of this SER, the applicant identified additional pipe/fittings and valves of the waste management system as subject to an AMR in their September 26, 2002, response to RAI 2.1-1. The intended functions for waste management components subject to an AMR include pressure boundary, filtration, and throttling.

2.3.3.16.2 Staff Evaluation

The staff reviewed Section 2.3.3.16 of the LRA, and the associated license renewal boundary drawings, to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the waste management system that are within the scope of license renewal, in accordance with 10 CFR 54.4(a). The staff then reviewed the AMR results provided in Table 3.3-16 of the LRA to determine whether the applicant appropriately identified the components of the waste management system that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the waste management system that were not listed in Table 3.3-16 to verify that the applicant properly identified the components that meet the above requirements. The staff also reviewed Sections 9.3.3, 11.2.2, 11.3.2, and 11.5.2 of the Unit 1 UFSAR, and Sections 9.3.3, 11.2.2, 11.3.2, and 11.4.2 of the Unit 2 UFSAR, and did not identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.3.3.16 of the applicant's LRA.

During the review, the staff determined that certain floor drains were credited in the internal flooding analysis presented in Appendix 3D of the Unit 1 UFSAR and Appendix 3.6F of the Unit 2 UFSAR. Specifically, these floor drains were credited in the internal flooding analysis following breaks of moderate energy pipe lines in several rooms which contain safety-related equipment. (One example is the Unit 2 shutdown cooling heat exchanger room described on page 3.6F-4 of the Unit 2 UFSAR.) During the June 10 to 11, 2002, meeting (documented in the meeting summary dated July 31, 2002), the staff questioned why these drain lines were not highlighted to show that they are within the scope of license renewal on the referenced license renewal boundary drawings. The applicant clarified the status of these drains in its November 27, 2002, supplemental response to RAI 2.2-2 by stating that all floor drains in the reactor auxiliary and fuel handling buildings credited in the flooding analyses are within the scope of license renewal. The staff find this response to be acceptable, as it confirms that these floor drains are within the scope of license renewal and subject to an AMR.

The staff review found that the components of the waste management system that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal and subject to an AMR in accordance with the 10 CFR 54.21(a)(1).

2.3.3.16.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the waste management system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.4 System Scoping and Screening Results: Steam and Power Conversion Systems

2.3.4.1 Main Steam, Auxiliary Steam, and Turbine

In Section 2.3.4.1 of the LRA, the applicant identifies the components of the main steam, auxiliary, and turbine systems that are within the scope of license renewal and subject to an AMR. These systems are further described in Sections 10.2 and 10.3 of the UFSARs for Units 1 and 2, respectively.

2.3.4.1.1 Technical Information in the Application

The steam and power conversion systems consist of the main steam, auxiliary steam, turbine, main feedwater, auxiliary feedwater, steam generator blowdown, and condensate systems, and associated components.

The main steam system transports steam from the steam generators to the main turbines and other secondary steam system components. The main steam system has the intended functions of providing the principal heat sink for the RCS, protecting the RCS and the steam generators from overpressurization, providing isolation of the steam generators during steam line breaks, and supplying steam to the auxiliary feedwater pump turbines.

Auxiliary steam has the intended function of providing pressure regulated and unregulated steam to plant auxiliary loads. Auxiliary steam isolates in certain high energy line break scenarios.

The turbine for each unit, which includes the associated generator, converts the steam input from main steam to the plant's electrical output, and provides first stage pressure input to the reactor protection system. The turbine stop valves close during fires and SBO events.

The applicant stated that some of the license renewal boundaries for the main steam system were established at normally open valves, and that this approach was considered acceptable for the main steam system because the open boundary valves are only required to mitigate potential spurious valve operation in the unlikely event of certain fires. In accordance with plant procedures, these normally open valves are closed for fire scenarios. In addition, the steam supply piping to the Unit 2 auxiliary feedwater turbine has drain lines with open throttle valves. These open valves prevent condensate/water accumulation in the piping and are throttled, such that leakage is insignificant and does not affect auxiliary feedwater turbine performance.

Steam traps, by design, are closed valves that open to release any accumulated condensate/water. Once the condensate is removed, the steam trap (valve) automatically returns to the closed state.

The main steam, auxiliary steam, and turbine systems are in the scope of license renewal because they contain the following SCs:

- safety-related and are relied upon to remain functional during and following DBEs,
- non-safety-related whose failure could prevent satisfactory accomplishment of the safety-related functions,
- part of the EQ Program, or
- relied on during fires, SBO, and ATWS events.

The applicant's listing of component types for the main steam, auxiliary steam, and turbine systems that are subject to an AMR in Table 3.4-1 of the LRA include valves (pressure boundary only), steam traps, strainers, thermowells, orifices, piping, tubing, and fittings. The intended functions for the components of the main steam, auxiliary steam, and turbine system subject to an AMR are pressure boundary, filtration, and throttling.

2.3.4.1.2 Staff Evaluation

The staff reviewed Section 2.3.4.1 of the LRA, and the associated license renewal boundary drawings, to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the main steam, auxiliary steam, and turbine systems within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

The staff reviewed the text, tables, and diagrams submitted by the applicant in Section 2.3.4.1 of the LRA and the UFSARs to determine whether any SCs of the main steam, auxiliary steam, and turbine systems that meet the scoping criteria in 10 CFR 54.4(a) may have been omitted from the scope of license renewal. The staff verified that those portions of the main steam, auxiliary steam, and turbine systems identified by the applicant as meeting the scoping requirements of 10 CFR 54.4(a). The staff then focused its review on those portions of the main steam, auxiliary steam, and turbine systems that were not identified by the applicant as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4(a). The staff also reviewed Sections 10.2 and 10.3 of the UFSARs to identify system intended functions that were not included in Section 2.3.4.1 of the LRA, and verified that these intended functions did not meet the scoping requirements of 10 CFR 54.4(a). Therefore, there is reasonable assurance that the applicant appropriately identified portions of the St. Lucie main steam, auxiliary steam, and turbine systems that are within the scope of license renewal, in accordance with 10 CFR 54.4(a).

The staff then determined whether the applicant had properly identified the in-scope SCs that are subject to an AMR in accordance with 10 CFR 54.21(a). The applicant identified the components that are subject to an AMR for the main steam, auxiliary steam, and turbine systems and listed them in Table 3.4-1 of the LRA. The staff performed its review by sampling the components that the applicant identified as within the scope of license renewal, but not subject to an AMR to verify that these components perform their intended functions with moving parts or with a change in configuration or properties or are subject to replacement based on qualified life or specified time period. Components reviewed by the staff met the above criteria for both units.

In Section 2.3.4.1 of the LRA, the applicant lists 10 license renewal boundary drawings that were highlighted to show the license renewal evaluation boundary for the main steam, auxiliary steam, and turbine systems. The staff compared the boundary drawings to the description in the UFSAR to ensure that the drawings were representative of the main steam, auxiliary steam, and turbine systems. The staff also sampled components shown on the boundary drawings that were not highlighted to ensure that these components did not perform any of the intended functions associated with the scoping criteria of 10 CFR 54.4(a).

During its review of Section 2.3.4.1 of the LRA, the staff determined that additional information was needed to complete its review. In Table 3.4-1 of the LRA, the applicant does not list certain components of the main steam, auxiliary steam, and turbine system, although license renewal boundary drawings identify them as being within the scope of license renewal. In particular, flexible hose connections, SZ-08-1A1, SZ-08-1A2, SZ-08-1B1, and SZ-08-1B2, which are shown on drawing 1-MS-04 at locations D3 and H3, are passive and long-lived and, in accordance with 10 CFR 54.21(a)(1), should be subject to an AMR. In a letter dated July 18, 2002, the staff questioned the applicant about the above hose connections that appeared to be subject to an AMR but were not included in Table 3.4-1 of the LRA. In its response dated

October 3, 2002, the applicant clarified that the flexible hose connections are included as part of the instrument air system and are listed in Table 3.3-8 of the LRA.

The staff asked for additional information by letter dated July 18, 2002 (RAI 2.3.4-2), regarding the acceptability of ending license renewal boundaries at normally open valves, since failure of the downstream piping may affect the intended function of pressure boundary. Examples of locations where the boundary ended at normally opened valves include locations B1, B2, F4, F5, F6, and F7 on drawing 1-MS-02; location H5 on drawing 1-MS-03; locations B1, B2, F4, F5, F6, and F7 on drawing 2-MS-02.

The applicant responded to this question by letter on October 3, 2002. The applicant stated that these main steam line isolation valves are procedurally controlled, such that they will be manually closed in the event that a main steam isolation valve fails to automatically close during certain fire events. This procedure is in accordance with the St. Lucie Units 1 and 2 SSAs. Considering that the SSAs and plant procedures specifically address manual main steam isolation for these fire scenarios, this approach has been previously accepted as part of the CLBs for Units 1 and 2.

The staff finds the applicant's response to RAI 2.3.4-2 to be acceptable on the basis that manual closure of the subject valves is controlled by FP procedures, which were developed and reviewed by site safety personnel and are available for inspection by the NRC.

The staff's review found that the components of the main steam, auxiliary steam, and turbine systems that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

2.3.4.1.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the main steam, auxiliary steam and turbine systems components subject to an AMR, in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.4.2 Main Feedwater and Steam Generator Blowdown

In Section 2.3.4.2 of the LRA, the applicant identifies the components of the main feedwater and steam generator blowdown systems which are within the scope of license renewal and subject to an AMR. These systems are further described in Sections 10.4.6 and 10.4.7 of the UFSAR for Unit 1, and Sections 10.4.7 and 10.4.8 of the UFSAR for Unit 2.

2.3.4.2.1 Technical Information in the Application

The main feedwater and steam generator blowdown systems have the intended functions of providing sufficient water flow to the steam generators to maintain an adequate heat sink for the RCS, providing for main feedwater and steam generator blowdown isolation following a LOCA or steam line break event, and assisting in maintaining steam generator water chemistry. Main feedwater supplies preheated, high-pressure feedwater to the steam generators at a rate equal to the main steam and steam generator blowdown flows. A three-element controller that

determines the desired feedwater flow by comparing the feed flow, steam flow, and steam generator level controls the feedwater flow rate.

Steam generator blowdown assists in maintaining required steam generator chemistry by providing a means for removal of foreign matter that concentrates in the evaporator section of the steam generator. Steam generator blowdown is continuously monitored for radioactivity during plant operation.

The applicant stated that some of the license renewal boundaries for the steam generator blowdown system were established at normally open valves. The applicant considered this approach acceptable for the steam generator blowdown system because the normally open valves at license renewal boundaries are only required to mitigate potential spurious valve operation in the unlikely event of certain fires. Plant procedures require that these normally open valves be closed for fire scenarios.

The main feedwater and steam generator blowdown system is in the scope of license renewal because it contains the following SCs:

- safety-related and are relied upon to remain functional during and following DBEs,
- are non-safety-related whose failure could prevent satisfactory accomplishment of the safety-related functions,
- part of the EQ Program,
- relied on during fire events, or
- relied on during SBO events.

The applicant listed the component types for the main feedwater and steam generator blowdown components subject to an AMR in Table 3.4-2 of the LRA, including valves (pressure boundary only), accumulators, orifices, thermowells, piping, tubing, and fittings. As discussed in Section 2.1 of this SER, the applicant identified additional pipe/fittings and valves of the main feedwater and steam generator blowdown system as subject to an AMR in its September 26, 2002, response to RAI 2.1-1. The intended functions for main steam, auxiliary steam, and turbine components subject to an AMR are pressure boundary, filtration, and throttling.

2.3.4.2.2 Staff Evaluation

The staff reviewed Section 2.3.4.2 of the LRA, and the associated license renewal boundary drawings, to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the main feedwater and steam generator blowdown systems within the scope of license renewal, and subject to an AMR, in accordance with 10 CFR 54.4 and 54.21(a)(1), respectively.

The staff reviewed the text, tables, and diagrams submitted by the applicant in Section 2.3.4.2 of the LRA and the UFSARs to determine whether any SCs of the main feedwater and steam generator blowdown systems that meet the scoping criteria in 10 CFR 54.4(a) may have been

omitted from the scope of license renewal. The staff verified that those portions of the main feedwater and steam generator blowdown systems identified by the applicant as meeting the scoping requirements of 10 CFR 54.4 in fact, do, meet these requirements for both Units 1 and 2. The staff then focused its review on those portions of the main feedwater and steam generator blowdown systems that were not identified by the applicant as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4. The staff also reviewed Sections 10.4.6 and 10.4.7 (Unit 1), and Sections 10.4.7 and 10.4.8 (Unit 2) of the UFSARs to identify system intended functions that were not included in Section 2.3.4.2 of the LRA, and verified that these intended functions did not meet the scoping requirements of 10 CFR 54.4(a). Therefore, there is reasonable assurance that the applicant appropriately identified portions of the main feedwater and steam generator blowdown systems that are within the scope of license renewal, in accordance with 10 CFR 54.4.

The staff then determined whether the applicant had properly identified the in-scope SCs that are subject to an AMR, in accordance with 10 CFR 54.21(a). The applicant identified components that are subject to an AMR for the main feedwater and steam generator blowdown systems and listed them in Table 3.4-2 of the LRA. The staff performed its review by sampling the components that the applicant identified as within the scope of license renewal, but not subject to an AMR to verify that these components perform their intended functions with moving parts or with a change in configuration or properties, or are subject to replacement based on qualified life or specified time period. Components reviewed by the staff met the above criteria for both units.

In Section 2.3.4.2 of the LRA, the applicant lists 11 license renewal boundary drawings that were highlighted to show the license renewal evaluation boundary for the main feedwater and steam generator blowdown systems. The staff compared the boundary drawings to the description in the UFSAR to ensure that the drawings were representative of the main feedwater and steam generator blowdown systems. The staff also sampled components shown on the boundary drawings that were not highlighted to ensure that these components did not perform any of the intended functions associated with the scoping criteria of 10 CFR 54.4(a).

During its review of Section 2.3.4.2, the staff determined that additional information was needed from the applicant. On license renewal boundary drawing 1-FW-02, the main feedwater isolation valve accumulators for Unit 1 are shown to be within the scope of license renewal; however, they are not listed in Table 3.4-2 of the LRA as being subject to an AMR. The accumulators for Unit 2 are listed in the table as being subject to an AMR.

In a letter dated July 18, 2002, the staff asked the applicant why the Unit 1 accumulators described above were not subject to an AMR since they performed an intended function. In its response dated October 3, 2002, the applicant stated that the Unit 1 accumulators shown on license renewal boundary drawing, 1-FW-02, are included as part of the instrument air system, and are listed in Table 3.3-8 of the LRA. The staff finds the applicant's response acceptable as it clarifies that the Unit 1 accumulator components are subject to an AMR, in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff review found that the components of the main feedwater and steam generator blowdown systems that have an intended function meeting the criteria of 10 CFR 54.4(a) have

been identified as being within the scope of license renewal, and subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.4.2.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the main feedwater and steam generator blowdown systems components subject to an AMR, in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.4.3 Auxiliary Feedwater and Condensate

In Section 2.3.4.3 of the LRA, the applicant identifies the components of the auxiliary feedwater and condensate systems that are within the scope of license renewal and subject to an AMR. These systems are further described in Sections 10.5.1 and 9.2.6 of the Unit 1 UFSAR, and Sections 10.4.9 and 9.2.6 of the Unit 2 UFSAR.

2.3.4.3.1 Technical Information in the Application

The auxiliary feedwater system has the intended function of supplying feedwater to the steam generators when normal feedwater sources are not available. Auxiliary feedwater for each unit contains two motor-driven pumps and one steam turbine driven pump. The pumps take suction from the condensate storage tank (CST) and discharge to the steam generators. Auxiliary feedwater is normally maintained in standby. Upon initiation, all three pumps on the affected unit start to supply the steam generators with feedwater.

The condensate system includes the CST that stores water for use by auxiliary feedwater to support safe shutdown of the plant. The CSTs are cross-connected between the units.

Auxiliary feedwater and condensate systems are in the scope of license renewal because they contain SCs that are:

- safety-related and are relied upon to remain functional during and following DBEs,
- non-safety-related whose failure could prevent satisfactory accomplishment of the intended functions of safety-related SCs,
- part of the EQ Program, or
- relied on during fires, SBO, and ATWS events.

The applicant listed the component types for the auxiliary feedwater and condensate systems subject to an AMR in LRA Table 3.4-3, including tanks, pumps, turbines, and valves (pressure boundary only), coolers, orifices, vortex breakers, sightglasses, piping, tubing, and fittings. As discussed in Section 2.1 of this SER, the applicant identified additional pipe/fittings and valves of the auxiliary feedwater and condensate systems as subject to an AMR in its September 26, 2002, response to RAI 2.1-1. The intended functions for auxiliary feedwater and condensate components subject to an AMR are pressure boundary, heat transfer, vortex prevention, and throttling.

2.3.4.3.2 Staff Evaluation

The staff reviewed Section 2.3.4.3 of the LRA, and the associated license renewal boundary drawings, to determine whether there is reasonable assurance that the applicant appropriately identified the portions of the auxiliary feedwater and condensate systems within the scope of license renewal and subject to an AMR, in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

The staff reviewed the text, tables, and diagrams submitted by the applicant in Section 2.3 of the LRA, and the UFSARs, to determine whether any SCs of the auxiliary feedwater and condensate systems that meet the scoping criteria in 10 CFR 54.4(a) may have been omitted from the scope of license renewal. The staff verified that those portions of the auxiliary feedwater and condensate systems identified by the applicant as meeting the scoping requirements of 10 CFR 54.4(a)do, in fact, meet these requirements for both units. The staff then focused its review on those portions of the auxiliary feedwater and condensate systems that were not identified by the applicant as within the scope of license renewal to verify that they do not meet the scoping requirements of 10 CFR 54.4(a). The staff also reviewed Sections 10.5.1 and 9.2.6 of the Unit 1 UFSAR, and 10.4.9 and 9.2.6 of the Unit 2 UFSAR, to identify system intended functions that were not included in Section 2.3.4.3 of the LRA, and verified that these functions did not meet the scoping requirements of 10 CFR 54.4(a).

The staff then determined whether the applicant had appropriately identified the in-scope SCs that are subject to an AMR, in accordance with 10 CFR 54.21(a). The applicant identified the SCs that are subject to an AMR for the auxiliary feedwater and condensate systems and listed them in Table 3.4-3 of the LRA. The staff performed its review by sampling the structures and compoents that the applicant identified as within the scope of license renewal, but not subject to an AMR, to verify that these SCs perform their intended functions with moving parts or with a change in configuration or properties, or are subject to replacement based on qualified life or specified time period. The SCs reviewed by the staff met the above criteria for Units 1 and 2.

In Section 2.3.4.3 of the LRA, the applicant lists two license renewal boundary drawings for each unit that were highlighted to show the license renewal evaluation boundary for the auxiliary feedwater and condensate systems. The staff compared the boundary drawings to the description in the UFSAR to ensure that the boundary drawings were representative of the auxiliary feedwater and condensate systems for Units 1 and 2. The staff also sampled portions of the boundary drawings that were not highlighted to ensure that these components did not perform any of the intended functions associated with the scoping criteria of 10 CFR 54.4(a).

During its review of Section 2.3.4.3, the staff determined that additional information was needed to complete its review. On license renewal boundary drawings 1-AFW-01 and 2-AFW-0 (at location D7), the applicant indicates that piping from the CST connects below the normal water level. The piping appeared to connect the lower portion of the CST with the condenser hotwell; failure of this piping could compromise the pressure boundary intended function of the CST. The applicant does not show, on the boundary drawings, that the piping is within in the scope of license renewal. In a letter dated July 18, 2002, the staff asked the applicant to justify why this CST piping is considered not to be within the scope of license renewal and not subject to an AMR.

In its response dated October 3, 2002, the applicant stated that license renewal boundary drawings should not be used to ascertain CST connection elevations for piping. The applicant cited from its plant Technical Specifications that the Unit 1 CST requires a minimum level of 439 m^3 (116,000 gallons), and the Unit 2 CST requires a minimum level of 1,162 m^3 (307,000 gallons). Non-safety-related lines connected to these CSTs utilize penetrations located above the minimum water levels, as required by Technical Specifications, such that assumed failures of these lines will not compromise the pressure boundary intended function of the CSTs.

The staff agrees with the applicant's conclusion that the above non-safety-related lines connected to the CSTs are not within the scope of license renewal on the basis that they do not perform or support any system intended functions that satisfy the scoping criteria of 10 CFR 54.4(a).

The staff's review found that the components of the auxiliary feedwater and condensate systems that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and subject to an AMR, in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.3.4.3.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the auxiliary feedwater and condensate systems components subject to an AMR, in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.5 Expanded SSCs For Criterion 2 Scoping

Section 54.4(a)(2) of 10 CFR Part 54 requires that all non-safety-related SCs whose failure could prevent satisfactory accomplishment of any of the safety-related functions identified in 10 CFR 54.4(a)(1) be included within the scope of license renewal.

2.3.5.1 Technical Information in the Application

In Section 2.1 of the LRA, the applicant described scoping and screening methodology for identifying SSCs that are within the scope of license renewal, in accordance with the requirements of 10 CFR 54.4(a)(2). In Sections 2.3 and 2.4 of the LRA, the applicant provided its scoping and screening results and identified the SSCs that are within the scope of license renewal and subject to an AMR.

Section 2.1.1.3 of the LRA indicates that seismic supports are considered for Criterion 2 scoping of non-safety-related mechanical components. However, contrary to the staff's position described in the interim staff guidance, dated December 3, 2001, and March 15, 2002, regarding 10 CFR 54.4(a)(2) and the seismic II/I issue, the applicant did not consider the potential for non-safety-related piping and components to have spatial interactions with safety-related components. Additionally, the applicant did not fully consider the staff's position on SBO described in the interim staff guidance, dated April 1, 2002.

Based on its review of the information provided in Sections 2.1 of the LRA, the staff requested additional information in RAIs 2.1-1 and 2.1-2, dated July 1, 2002. In RAI 2.1-1, the staff asked

the applicant to describe the scoping methodology implemented for the evaluation of the criterion defined in 10 CFR 54.4(a)(2). In addition, the applicant was asked to indicate the option(s) credited, list the SSCs included within scope, list those SCs for which AMRs were conducted, and describe (as applicable for each structure or component) the aging management programs that will be credited for managing the identified aging effects. In RAI 2.1-2 the staff asked the applicant to describe the process used to evaluate the SBO portion of the criterion defined in 10 CFR 54.4(a)(3). The applicant was also asked to (1) list those additional SSCs included within scope as a result of the SBO evaluation, (2) list those SCs for which AMRs were conducted, and (3) describe (as applicable for each structure or component) the AMPs that will be credited for managing the identified aging effects.

By letter dated September 26, 2002, the applicant responded to the staff's RAIs. In its response to RAIs 2.1-1, the applicant stated that the following five components and structural components have been included in the scope of license renewal to protect safety-related SSCs from a failure of non-safety-related piping systems and other SSCs (scoping criteria 10 CFR 54.4(a)(2)).

- non-safety-related piping segments and supports at safety-related/non-safety-related functional boundaries that extend beyond the system pressure boundary component to ensure the integrity of the safety-related/non-safety-related functional system pressure boundary (Tables 3.5-1 through 3.5-16)

- piping/component supports for non-safety-related mechanical systems with the potential of "seismic II over I" interaction with safety-related components (Tables 3.5-1 through 3.5-16)

- non-safety-related conduit, cable trays, supports, and other structural components with the potential of "seismic II over I" interaction with safety-related components (Tables 3.5-1 through 3.5-16)

- design features required to accommodate the effects of flooding, such as curbing, platforms, sumps, sump pumps, and drains (Tables 3.5-1 through 3.5-16, Table 3.3-13, and Table 3.3-16)

- design features required to accommodate the effects of spray, jet impingement, and pipe whip, such as pipe whip restraints and internal barriers (Tables 3.5-1 through 3.5-16)

In its response to RAI 2.1-2, the applicant performed an evaluation to determine the additional electrical and structural components that are within the scope of license renewal for restoration of offsite power at St. Lucie. An AMR evaluation was also performed for the electrical and structural components determined to be within the scope of license renewal and requiring an AMR.

2.3.5.2 Staff Evaluation

The staff's evaluation of the applicant's scoping methodology is presented in Section 2.1.3.1 of this SER. The evaluation of the associated SSCs initially identified in each LRA (Sections 2.3

and 2.4 of this SER) includes the expanded SCs for nine mechanical systems and structures for three buildings or areas that were originally within the scope of license renewal, but whose boundaries were expanded in the applicant's RAI response dated September 26, 2002. Components of two additional non-safety-related piping systems were brought into scope in the applicant's RAI response, the demineralized water system for Unit 1 (Unit 2 was already in scope as discussed in Section 2.3.3.3 of this SER), and the Unit 1 heater drains and vents system. Additional structures for one new area, the switchyard, were also brought into scope.

The following staff evaluation focuses on the non-safety-related piping systems which have a spatial relationship to safety-related components, such that their failure could adversely impact the performance of an intended safety function. Specifically, the staff reviewed the applicant's scoping method in section 2.1.3.1 of this SER. The following discussion focuses on the results obtained for the expanded scope SSCs added in response to RAI 2.1-1 and 2.1-2.

The scoping method described in that RAI response includes several steps to identify the second configuration non-safety-related piping systems. In the first step, the applicant identified the following structures that contain both safety-related and non-safety-related SSCs.

- containments
- component cooling water areas
- condensate storage tank enclosures
- diesel oil equipment enclosures
- emergency diesel generator buildings
- fuel handling buildings
- intake structures
- RABs
- steam trestle area
- turbine building (Unit 1 only)
- ultimate heat sink dam
- yard structures

Section 2.1.1.3 of the LRA, "Non-Safety-Related Criteria Pursuant to 10 CFR 54.4(a)(2)," states that in the case of "seismic II over I," or the potential for non-safety-related SSCs to fail and prevent a safety function, the non-safety-related SSC must be supported in a manner to prevent it from falling on safety-related systems or components. Thus, the supports for these SSCs were included within the scope of license renewal. However, in response to staff RAI 2.1-1, the applicant reviewed the locations of non-safety-related SSs relative to the safety-related SSs, using an area-based approach.

The component and structural component level scoping performed as part of the screening process then established the specific non-safety-related seismic interaction component, or structural component types, located within the structure for inclusion in the license renewal scope. Those items determined to have an interaction were included within the scope of license renewal, and AMRs were performed and summarized in tables similar to those contained in the LRA. Revised tables were presented that expanded the boundaries for nine mechanical systems previously identified as being in the scope of license renewal.

Systems with expanded boundaries for Unit 1 only

- primary makeup water
- main feedwater
- auxiliary feedwater and condensate

Systems with expanded boundaries for Unit 2 only

- demineralized makeup water

Systems with expanded boundaries for both Units 1 and 2

- chemical and volume control
- component cooling water
- sampling
- service water
- waste management

In addition, two additional system were brought into scope for Unit 1:

- heater drains and vents
- demineralized makeup water

The heater drains and vents system identified above applies to Unit 1 only, because only the turbine building for Unit 1 contains safety-related components that are within the scope of license renewal. As identified in the applicant's response to RAI 2.1-1, the components of this system that are within the scope of license renewal and subject to an AMR include piping/fittings and valves. The intended function of these components is pressure boundary.

Additional components and structures were also brought into scope by the applicant in response to RAI 2.1-2. One new area, the switchyard, was added, and additional components were included for the turbine buildings and yard structures. Consistent with the NRC position, the following additional structural components are included in the scope of license renewal as meeting the scoping criteria of 10 CFR 54.4(a)(3) for restoration of offsite power:

Switchyard

- startup transformer circuit breaker foundations
- covered cable trenches
- electrical component supports
- switchyard control building
- dc electrical enclosures
- cable trays
- startup transformer circuit breaker electrical enclosures
- transmission towers
- transmission tower foundations

Turbine buildings

- switchgear rooms

- switchgear enclosures
- switchgear supports
- nonsegregated-phase bus supports

Yard structures

- transmission towers
- nonsegregated-phase bus supports
- nonsegregated-phase bus foundations
- startup transformer foundations
- 4.16 kv switchgear foundations
- transmission tower foundations
- electrical duct banks and manholes already included in Table 3.5-16.

The results of this expanded scoping were also reviewed by the NRC regional inspection team during an inspection held October 21through 25, 2002. The inspection team determined that the applicant's scoping and screening activities were performed in accordance with the prescribed methodology and were adequate. In Inspection Report 2002-07, dated November 27, 2002, the inspection team reviewed the implementation of the applicant's methodology for identifying the portions of systems not originally included in scope and added as a result of RAIs 2.1-1 and 2.1-2.

The staff reviewed the applicant's responses to RAIs 2.1-1 and 2.1-2, the list of SSs included within the scope of license renewal, and the findings of the NRC inspection team. Based on the above, the staff finds the expanded scope SSCs identified in the RAI responses to be acceptable because the applicant included all the non-safety-related SSCs with the configurations that meet the scoping criterion of 10 CFR 54.4(a)(2) (seismic II over I) and 10 CFR 54.4(a)(3) (SBO), as discussed in the applicant's response to these RAIs. The staff concluded that the portion of the applicant's response to RAIs 2.1-1 and 2.1-2 that relate to the scoping and screening results as described above is acceptable. This conclusion is based on the RAI response provided, and the inspection report confirmation, that these non-safety-related piping segments and supports were included in the scope, as well as on the staff position stated in the Interim Staff Guidance for Seismic II/I, dated December 3, 2001, and SBO, dated April 1, 2002.

On the basis of its review of the information contained in the RAI responses, and its confirmation from the inspection, the staff did not identify any omissions in the scoping and screening of the expanded 10 CFR 54.4(a)(2) and 10 CFR 54.4(a)(3) SSCs.

2.3.5.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

Therefore, the staff concludes that there is a reasonable assurance that the applicant has identified those SSCs that are within the scope of license renewal, as well as the SCs that are

subject to an AMR in accordance with 10 CFR 54.4(a)(2), 10 CFR 54.4(a)(3) and 10 CFR 54.21(a)(1).

2.4 Scoping and Screening Results: Structures

This section addresses the structures' scoping and screening results for license renewal. The structures consist of the following (the SER sections are also provided):

This section addresses the staff's review of the results of the scoping and screening methodology for structures. The structures consist of the following:

Containments

- containment vessels
- reactor containment shield buildings
- reactor containment shield building interior components

Other Structures

- component cooling water areas
- condensate polisher building
- condensate storage tank enclosures
- diesel oil equipment enclosures
- emergency diesel generator buildings
- fire rated assemblies
- fuel handling buildings
- fuel handling equipment
- intake, discharge, and emergency cooling canals
- intake structures
- reactor auxiliary buildings
- steam trestle areas
- turbine buildings
- ultimate heat sink dam
- yard structures

In accordance with the requirements stated in 10 CFR 54.21(a)(1), the applicant must identify and list structures and components subject to an AMR. These are passive, long-lived structures and components that are within the scope of license renewal. To verify that the applicant properly implemented its methodology, the staff reviewed the scoping and screening results to confirm that there was no omission of structures or components that are subject to an AMR.

2.4.1 Containments

In Section 2.4.1.1, "Containment Vessels," Section 2.4.1.2, "Reactor Containment Shield Buildings," and Section 2.4.1.3, "Reactor Containment Shield Building Interior Components" of the LRA, the applicant describes the SCs of the containment and reactor shield buildings at each St. Lucie unit. The containment and reactor shield buildings are further described in

Section 3.8.2 of the UFSARs for St. Lucie Units 1 and 2. The applicant grouped the component types that are within the scope of license renewal and subject to an AMR in Table 3.5-2 of the LRA for all of the three structures that comprise the containment (1) the containment vessels, (2) the reactor containment shield building, and (3) the reactor containment shield building interior components (including fuel handling equipment and tools located inside the containment)

In Table 3.5-2, the applicant identifies the following SCs as being subject to an AMR: containment vessels, structural steel framing, stairs, ladders, platforms; handrails, checkered plate, grating, component supports, reactor vessel supports, pressurizer supports, RCP supports, steam generator supports, air-tight bulkhead doors (shield building), maintenance hatch outside doors, equipment and personnel hatches (maintenance hatches, personnel hatches, and escape hatches) including hinges, latches, and equalizing valves, piping and spare penetrations (includes bellows), fuel transfer tube penetration sleeves, fuel transfer tubes and expansion bellows, reactor cavity seal rings, refueling pool liner plates, fuel transfer flange supports, fuel transfer system (Unit 2 only), electrical penetrations, heating and ventilation penetrations, fuel transfer tube isolation flanges, passive components of the polar cranes, telescoping jib cranes, other cranes and hoists, and refueling machines, conduits and cable trays, conduit and cable tray supports, electrical and instrument panels and enclosures, electrical and instrument panel and enclosure supports, HVAC duct supports, tubing supports, trisodium phosphate baskets (Unit 2 only); pipe and component supports; non-safety-related pipe segments between class; break and seismic anchor; pipe whip restraints; recirculation sump screens; miscellaneous steel (i.e. radiation shielding, missile barriers, hatch frame covers, etc.); reinforced concrete structures above ground water (exterior walls and roofs); reinforced concrete structures below ground water (exterior walls and foundation); other reinforced concrete structures (i.e.,interior shield walls, beams, slabs, missile shields, equipment pads, etc.); masonry block walls; containment vessel moisture barriers; reactor cavity seal ring seals; containment hatch seals and gaskets; airtight bulkhead door seals; fuel transfer tube penetration flexible membranes (in annulus); and lubrite sliding supports.

The Units 1 and 2 containments are within the scope of license renewal because they are seismic Category 1 structures designed to shelter and house the RCS and to prevent the uncontrolled release of radioactivity. The containment vessel is the third and final barrier against possible release of radioactive material to the environment during the unlikely event of failure of the RCS. The low leakage steel containment shell and penetrations are designed to confine radioactive materials that could be released by accidental loss of integrity of the reactor coolant pressure boundary.

The intended functions of the containments' SCs (a composite of the three sections of the LRA sections noted above) that are in the scope of license renewal are listed in Table 3.5-2 of the LRA as follows.

- provide a pressure boundary
- provide structural support to safety-related components
- provide shelter/protection to safety-related components (including radiation shielding)
- provide fire barriers to retard spreading of a fire
- provide missile barriers

- provide structural support to non-safety-related SCs whose failure could prevent satisfactory accomplishment of the intended functions of safety-related SCs
- provide flood protection barriers
- provide a boundary for safety-related system ventilation
- provide structural support and/or shelter to components required for FP, ATWS, and/or SBO
- provide restraints for pipe whipping and/or protect systems and equipment from jet impingement

The staff reviewed the following three sections of the LRA pertaining to the St. Lucie containments and related sections of the UFSARs, to determine whether there is reasonable assurance that the applicant has identified and listed the SCs within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

2.4.1.1 Containment Vessels

In Section 2.4.1.1 of the LRA, the applicant describes the SCs of the containment vessels that are within the scope of license renewal and subject to an AMR. The containment vessels are further described in Sections 3.8.2 of the UFSARs for Units 1 and 2.

2.4.1.1.1 Technical Information in the Application

The containments for Units 1 and 2 consists of a freestanding steel containment vessel structure surrounded by the reactor containment shield building. The applicant describes major components of the containment vessel in Section 2.4.1.1 of the LRA the containment vessel structure, mechanical penetrations, electrical penetrations, airlocks and hatches, and the fuel transfer tubes.

The containment houses the RCS, which include the reactor pressure vessel, the reactor coolant piping and pumps, the steam generators, the pressurizer and pressurizer quench tank, the SI tanks, the RCS supports, and other important systems that interface with the RCS. The containment also houses and supports the components required for plant refueling, including the polar crane, refueling cavity, and portions of the fuel handling system. The containment vessel and its attachments meet the license renewal scoping criteria of 10 CFR 54.4(a) because they perform the following intended functions (1) provide a leak-tight barrier to prevent uncontrolled release of radioactivity, (2) provide structural or functional support of safety-related SSCs, and (3) provide shelter or protection of safety-related equipment.

Containment Vessel Structures. Each containment vessel is a low leakage steel shell structure designed to confine radioactive materials that could be released by accidental loss of integrity of the reactor coolant pressure boundary. The containment vessel structure is a right circular cylinder with a hemispherical dome and an ellipsoidal bottom.

Mechanical Penetrations. Mechanical penetrations are provided for passage of process, service, sampling, and instrumentation piping into the containment vessel while maintaining containment integrity and providing a leak-tight seal. The mechanical penetration assemblies typically consist of a containment vessel penetration nozzle, a process pipe, a shield building

penetration sleeve, and a shield building bellows seal. For cold penetrations, the containment vessel penetration nozzle is an integral part of the process pipe. For hot or semi-hot penetrations, a multiple flued head is provided as an integral part of the process pipe. A guard pipe is welded to the flued head. In addition, for hot penetrations, an expansion joint bellows is welded to the flued head and the containment vessel penetration nozzle to accommodate thermal movement. At the terminal piping penetration assembly near the reactor containment shield building, a low pressure leakage barrier is provided to form a shield building bellows seal. The bellows provides a flexible membrane type closure between the shield building penetration sleeve, which is embedded in the reactor containment shield building, and the process pipe.

Electrical Penetrations. All electrical conductors that penetrate through the containment vessel, annulus, and reactor containment shield building use canister or header plate type assemblies. The primary containment penetration is inserted in the containment vessel nozzle and is field welded inside the steel vessel to form the sealing weld. The secondary seal is inserted in a nozzle embedded in the concrete shell of the reactor containment shield building. The secondary shield is welded to the nozzle in the reactor containment shield building. The primary containment penetrations feature hermetic cable sealing achieved by ceramic, glass, or high temperature, thermoplastic material bonding to a metal flange. The flange is welded to a header plate, which is welded to the penetration nozzle. Either epoxy resin or thermoplastic material forming a continuous seal between the metal canister and all conductors achieves the secondary seal.

Airlocks and Hatches. Two equipment hatches are provided for each containment vessel, a construction hatch and a maintenance hatch. The construction hatch for each unit is a welded steel assembly with a welded construction hatch cover. The maintenance hatch is a welded assembly with a double gasketed flanged and bolted hatch cover. Two personnel airlocks are provided for each containment vessel. These are welded steel tube assemblies. Each airlock has a double gasketed door at each end of the tube.

Fuel Transfer Tubes. Each unit has a fuel transfer tube to transfer fuel assemblies between the refueling cavity in the containment and the SFP in the fuel handling buildings during refueling operations. The fuel transfer tube penetration consists of a stainless steel transfer tube installed in a concentric carbon steel pipe sleeve. The fuel transfer tube is fitted with a double gasketed blind flange in the containment and a standard gate valve in the fuel handling building. The pipe sleeve is welded to the containment vessel. Three bellows are provided in the containment and one bellows in the fuel handling building. A flexible membrane expansion joint is provided to compensate for building settlement and differential motion between the containment vessel, the reactor containment shield building, and the fuel handling building.

2.4.1.1.2 Staff Evaluation

The staff reviewed Section 2.4.1.1 of the LRA, and associated license renewal boundary drawings, to determine whether there is reasonable assurance that the applicant appropriately identified the SCs of the containment vessels that are within the scope of license renewal, in accordance with 10 CFR 54.4(a). The staff then reviewed the AMR results provided in Table 3.5-2 of the LRA to determine whether the applicant appropriately identified the components of the containment vessels that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the containment vessels that were not listed in Table

3.5-2 to verify that the applicant properly identified the components that meet the above requirements. The staff also reviewed Section 3.8.2 of the UFSARs for Units 1 and 2 and did not identify any intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.4.1.1 of the LRA.

During the review, the staff questioned the applicant's omission of certain passive and long-lived structural components from Table 3.5-2 of the LRA. By letter dated July 1, 2002, the staff questioned the omission of a manway shown on the top of the steel containment structure at location B5 on general arrangement drawings 8770-G-067 (Unit 1 UFSAR, Figure 1.2-10) and 2998-G-067 (Unit 2 UFSAR, Figure 1.2-10) (RAI 2.4.1-1). This manway and associated closure bolting and gaskets are not listed in Table 3.5-2. The staff asked the applicant to justify why these components are not within the scope of license renewal and subject to an AMR, as these components appear to form a portion of the containment pressure boundary.

By letter dated October 3, 2002, the applicant responded that the manways are permanently welded to the containment vessels, similar to the construction hatches. The manways are considered part of the containment vessels listed in Table 3.5-2 of the LRA (page 3.5-35) and are not listed separately. Thus, the manways are included within the scope of license renewal, are subject to an AMR, and were evaluated with the containment vessels. The staff finds the applicant's response to be acceptable on the basis that it clarifies that the above components are in the scope of license renewal and subject to an AMR.

In the letter dated July 1, 2002, the staff asked the applicant to justify the omission of a structural material identified as Ethafoam (RAI 2.4.1-2), shown between the containment vessel and concrete in general arrangement drawings 8770-G-067 (Unit 1 UFSAR, Figure 1.2-10) and 2998-G-067 (Unit 2 UFSAR, Figure 1.2-10) at locations K1, K10, and I15 on both drawings, from the scope of license renewal and an AMR. The staff stated that in Table 3.5-2 of the LRA, the applicant identified the containment vessel moisture barrier component, made of elastomer, as within the scope of license renewal. The Ethafoam material has a similar intended function as the moisture barrier, in that it is to "provide shelter/protection to safety-related components (including radiation shielding)." (Ethafoam is a polyethylene foam.)

By letter dated October 3, 2002, the applicant responded that the Ethafoam material is associated with the containment vessel moisture barriers noted in Section 2.4.1.1 of the LRA (on page 3.5-14). The moisture barrier detail calls for Ethafoam material covered by a joint sealer (elastomer) between each steel containment vessel and the concrete floor at Elevation 23 feet. The purpose of the Ethafoam material is to occupy the void space between the concrete and the steel vessel during construction. The purpose of the joint sealer is to prevent moisture intrusion between the concrete and the steel vessel. Therefore, the elastomer joint sealer is included in Table 3.5-2 of the LRA as "containment vessel moisture barriers" because it performs the intended function of excluding moisture. The Ethafoam material is not included in Table 3.5-2 because it does not perform or support any intended functions that satisfy the scoping criteria of 10 CFR 54.4(a). The staff finds the applicant's response to be acceptable on the basis that it clarifies that the Ethafoam material does not perform any intended function as defined in 10 CFR 54.4(a).

The status of the containment and shield building penetrations were discussed during a meeting with the applicant on May 15 to 16, 2002. The containment and shield building

penetrations are components of a number of systems and are shown on many of the license renewal boundary drawings. As a result, the containment and shield building penetrations are listed as subject to an AMR in many LRA sections (including mechanical penetrations, containment cooling, containment spray, containment isolation, SI, CVCS, component cooling water, instrument air, sampling, ventilation, main steam, feedwater, and auxiliary feedwater). Because of the large number of license renewal drawings and LRA sections with containment penetrations, the staff was unable to determine, with reasonable assurance, that all of the containment and shield building penetrations shown in Table 6.2-16 of the Unit 1 UFSAR and Table 6.2-52 of the Unit 2 UFSAR were within the scope of license renewal.

As documented in a summary of the May 15 through 16, 2002 meeting, dated July 1, 2002, the applicant referred the staff to page 2.3-11 of the LRA, which states that, "all containment penetrations and associated containment isolation valves and components that ensure containment integrity, regardless of where they are described, require an AMR." The staff finds this response to be acceptable, as it confirms that the containment penetrations and associated components are subject to an AMR in accordance with 10 CFR 54.21(a)(1).

In a letter dated July 1, 2002, the staff questioned the applicant about the omission of certain hatches as subject to an AMR (RAI 2.4.1-3). In Section 2.4.1.1.4 of the LRA, the applicant states that two equipment hatches are provided for each containment vessel, a construction hatch and a maintenance hatch. The applicant further states that two personnel airlocks are provided for each containment vessel. Section 3.5.1.1 and Table 3.5-2 of the LRA list maintenance, personnel, and escape hatches. Outside doors for maintenance hatches are also noted; however, construction hatches are not explicitly included. The staff asked why the construction hatch is not identified in Section 3.5.1.1 and Table 3.5-2 of the LRA.

By letter dated October 3, 2002, the applicant responded that the construction hatches are permanently welded shut and are, therefore, considered part of the containment vessels listed in Table 3.5-2 of the LRA. The two personnel airlocks for each containment described in Section 2.4.1.1.4 of the LRA are the personnel hatch and the escape hatch in Table 3.5-2. The staff finds the applicant's response to be acceptable on the basis that all containment hatches and airlocks are included in the scope of license renewal and are subject to an AMR.

In the performance of the review, the staff focused on components that were not identified as subject to an AMR. The staff considered the system functions described in the UFSAR to determine whether components having intended functions meeting the criteria of 10 CFR 54.4(a) were omitted from the scope of license renewal. In meetings with the applicant on May 15 through 16, 2002, the staff observed that the fuel transfer tubes are shielded with lead shot (shown on general arrangement Figure 1.2-8 of the Unit 1 UFSAR at location C15). Lead shielding is also shown in the vicinity of the refueling cavity (shown on general arrangement Figure 1.2-8 of the Unit 2 UFSAR at location C16). However, none of the component types listed in Table 3.5-2 of the LRA identify components composed of lead or lead shot materials. If shielding components made of lead and lead shot materials have a safety-related intended function, they should be in the scope of license renewal and subject to an AMR.

In response, the applicant indicated that in Section 12.3.1.5 of the Unit 1 UFSAR and Section 12.3.1.6 of the Unit 2 UFSAR, the lead shielding is described as being installed for the purpose of personnel protection. The staff finds the applicant's omission of these components

acceptable on the basis that the lead shot shielding does not perform any intended function as defined in 10 CFR 54.4(a).

The staff's review found that the SCs of the containment vessels that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.1.1.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the containment vessels, including containment vessel structures, mechanical penetrations, electrical penetrations, airlocks and hatches, and fuel transfer tubes structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.4.1.2 Reactor Containment Shield Buildings

In Section 2.4.1.2 of the LRA, the applicant describes the SCs of the reactor containment shield building that are within the scope of license renewal and subject to an AMR. The reactor containment shield buildings are described in Section 3.8.2.2.1 of the Unit 1 UFSAR, and Section 3.8.4.1.1 of the Unit 2 UFSAR.

2.4.1.2.1 Technical Information in the Application

The reactor containment shield building is a reinforced concrete right cylinder structure with a shallow dome roof surrounding the containment vessel. Each reactor containment shield building is a freestanding structure, with concrete fill placed in the bottom portion of the structure to support the steel containment vessel. The reactor containment shield building protects the containment vessel from external missiles, provides biological shielding, collects fission products that may leak from the containment vessel following an accident, and provides environmental protection for the containment vessel.

The containment vessel and reactor containment shield building are supported by a common base slab. The reactor containment shield building cylinder wall is directly supported by the base slab. The steel containment vessel is supported on fill concrete that transfers the loads by bearing to the base slab. To assure proper contact between the containment vessel and the concrete, the interface is grouted with epoxy.

2.4.1.2.2 Staff Evaluation

The staff reviewed Section 2.4.1.2 of the LRA, and associated license renewal boundary drawings, to determine whether there is reasonable assurance that the applicant appropriately identified the SCs of the reactor shield building that are within the scope of license renewal in accordance with 10 CFR 54.4(a). The staff then reviewed the AMR results provided in Table 3.5-2 of the LRA to determine whether the applicant appropriately identified the components of the reactor containment shield building that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff sampled those SCs of the reactor shield building that were not listed in

Table 3.5-2 to verify that the applicant properly identified the SCs that meet the above requirements. The staff also reviewed Section 3.8.2.2.1 of the Unit 1 UFSAR and Section 3.8.4.1.1 of the Unit 2 UFSAR, and did not identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.4.1.2 of the LRA.

During the review, the staff determined that additional information was needed to complete its evaluation. In Section 2.4.1.2 of the LRA, the applicant states that the steel containment vessel is supported on fill concrete that transfers the loads by bearing to the base slab. The component group "reinforced concrete below ground water (exterior walls and foundation)," listed in Table 3.5-2 of the LRA describes the base slab. However, it is not clear whether this same description also applies to fill concrete between the containment vessels and the base slab. The fill concrete provides structural support to the containment vessel and, as such, should be within the scope of license renewal and subject to an AMR. In a letter dated July 1, 2002, the staff asked the applicant to clarify the component type that applies to fill concrete (RAI 2.4.1-1).

By letter dated October 3, 2002, the applicant responded that the fill concrete between the containment vessels and the base slabs is included in Table 3.5-2 of the LRA as part of the "reinforced concrete below ground water" component group. The staff finds the response to be acceptable on the basis that it clarifies that the fill concrete is in the scope of license renewal and subject to an AMR, in accordance with 10 CFR 54.21(a)(1).

In a letter dated July 1, 2002, the staff asked the applicant to justify the omission of the main plant vent stacks from being subject to an AMR (RAI 2.4.1-6). The plant vent stacks are components of the SBVSs, but are also large structures attached to the exterior of the reactor shield buildings. In the LRA, the applicant states that these components are not within the scope of license renewal, and are not subject to an AMR, for the following reasons.

Page 2.3-26 of the LRA states

> considering St. Lucie Units 1 and 2 accident analyses assume ground level releases, the plant vent stacks do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and therefore are not within the scope of license renewal.

Page 2.1-4 of the LRA states

> The offsite dose analyses indicate that the radiological consequences of these design basis events, except for the Unit 2 FHA, represent a small fraction of the 10 CFR Part 100 limits. As a result, SSCs related to the prevention and/or mitigation of these design basis events do not meet the scoping criteria of 10 CFR 54.4(a)(1)(iii). This equipment will still be evaluated relative to the scoping criteria of 10 CFR 54.4(a)(2) and 10 CFR 54.4(a)(3).

However, the structural aspects of the vent stacks are not discussed in Section 2.4 of the LRA. The vent stack structures are not subject to an AMR, although the supports for the vent stacks are identified in Table 3.5-2 of the LRA as being subject to an AMR. The vent stacks for both units are shown on the enlarged site plot plan drawing 2998-G-059 (Figure 1.2-2 of both UFSARs for Units 1 and 2) at location G7 for Unit 1 and location G10 for Unit 2. The vent stack for Unit 1 is also shown in drawing 8770-G-067 at locations C11 through H11. These stacks are large structures with a height of about 140 feet and an outer diameter of about 6 feet. The

vent stacks are attached to and supported by the shield building structure, and sit on top of the penetration area of the RAB.

The staff questioned the applicant about whether the vent stacks should be included within the scope of license renewal and subject to an AMR for the following reasons:

- The vent stacks are substantial structures in close proximity to the shield buildings and sit directly on top of portions of the RABs. The shield and RABs are within the scope of license renewal and have safety-related intended functions. Failure of the vent stack could damage nearby buildings and components and render them unable to perform their safety-related intended functions.

- The vent stacks contain and support radiation monitors that are relied upon to function in the event of a waste gas accident. As described in Section 15.4.2-2 of the Unit 1 UFSAR, the high radiation alarms from these monitors are a signal to manually close the control room ventilation intake dampers.

- Blockage of effluent flow from the vent stack as a result of a structural failure could prevent the SBVS from performing its in-scope intended function.

By letter dated October 3, 2002, the applicant responded that structural failure of the vent stacks would not result in the failure of the containments and RABs for Units 1 and 2 to perform their safety-related intended functions. If the vent stacks were assumed to fall, they could potentially impact the walls of the containments, or the walls and/or roofs of the RABs. These structures are constructed of cast-in-place, reinforced concrete with a thickness ranging from 1 to 3 feet. They are designed to resist high energy missiles (Section 3.5 in the UFSARs for Units 1 and 2) which would bound the impact energy of a falling vent stack.

Although the vent stack radiation monitors are noted in Section 15.4.2-2 of the Unit 1 UFSAR, these monitors do not perform or support any system intended functions that satisfy the scoping criteria of 10 CFR 54.4(a). In this section of the UFSAR, the applicant states that:

> Releases from the waste gas tank are exhausted by the auxiliary building main ventilation system through the plant vent. This exhaust is assumed to be released at ground level and to leak back into the auxiliary building.
>
> It is conservatively assumed that the control room immediately receives inleakage from the RAB.
>
> The waste gas accident would result in a high radiation alarm from either local monitors or the plant vent.

The local monitors noted in this statement are the ones located in control room air conditioning. As described in Section 9.4.1 of the Unit 1 UFSAR, and Section 12.3.4.2.3.2 of the Unit 2 UFSAR, safety-related isolation of control room air conditioning is provided by redundant radiation monitors located in each of the control room air conditioning air intakes. As described

in Section 2.3.3.15 of the LRA, the control room air conditioning subsystems (and associated radiation monitors) for Units 1 and 2 are included in the scope of license renewal.

The staff considers the applicant's response to RAI 2.4.1-6 to have three relevant parts (1) structural failure of the vent stack would not result in blockage of effluent flow, (2) no safety-related equipment is located nearby such that it could be damaged by the fall of the vent stack, and (3) the impact of a falling vent stack is bounded by the impact momentum of missiles analyzed in the UFSAR.

The staff agrees with the applicant's statement that structural failure of the vent stack would not result in blockage of effluent flow, on the basis of industry and plant specific experience. The vent stacks are large steel cylinders mounted at a high elevation; a failure mode which completely blocks the effluent outlet is unlikely.

To confirm the second part of the applicant's response to RAI 2.4.1-6, the staff requested that the inspection team confirm that failure of the main plant stack or the fuel handling building vent stack would not damage safety-related equipment. As documented in Inspection Report 2002-07, dated November 27, 2002, the inspectors walked down the associated roof areas and reviewed drawings (for Elevation 42 feet) of the RAB. The inspectors concluded that there is no safety-related equipment on the roof of the RAB that would be affected by failure of the main plant stack or the fuel handling building.

The staff considered the third part of the applicant's response to RAI 2.4.1-6. The missiles considered in the cited UFSAR analysis are not as massive as a plant vent stack. The staff therefore, requested that the applicant justify the statement that the impact of high energy missiles (as analyzed in Section 3.5 in the UFSARs for Units 1 and 2) would bound the impact energy of a falling vent stack. By letter dated November 27, 2002, the applicant supplemented its response to RAI 2.4.1-6 with the following information.

> An analysis has been performed that demonstrates a structural failure of a plant vent stack is enveloped by the high-energy missiles described in the UFSARs. The 135' tall plant vent stack weighs approximately 64,000 lbs. The impact energy of the bounding critical case missile is approximately 155,000 ft-lbs. The incremental impact energy of a fallen vent stack ranges from 2 ft-lbs at the base to approximately 96,000 ft-lbs at the top.

The staff finds the third part of the applicant's response to RAI 2.4.1-6 to be acceptable on the basis that the impact energies of a falling vent stack have been demonstrated to be less than the missile energies previously analyzed by the applicant.

On the basis that (1) the main plant vent stacks do not have an intended function meeting the criteria of 10 CFR 54.4(a) and (2) the failure of the vent stacks would not result in potential spatial interactions that could cause the failure of safety-related structures or components. The staff agrees with the applicant's conclusion that the main plant vent stacks for Units 1 and 2 should not be included within the scope of license renewal and are not subject to an AMR

The staff's review found that the SCs of the reactor containment shield buildings that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.1.2.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the reactor containment shield building structural components subject to an AMR, in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.4.1.3 Reactor Containment Shield Building Interior Components

In Section 2.4.1.3 of the LRA, the applicant describes the interior SCs of the containment vessels and reactor containment shield buildings that are within the scope of license renewal and subject to an AMR. The interior SCs of the containment vessels and reactor containment shield buildings are further described in Section 3.8.3 of the UFSARs for St. Lucie Units 1 and 2.

2.4.1.3.1 Technical Information in the Application

The interior structures of the containment vessels and reactor containment shield buildings consist of concrete and steel components. The major concrete internal components are the primary and secondary shield walls, the refueling cavity, the operating floor, and the enclosures around the pressurizer and steam generators. The major steel internal components are the RCS supports, the refueling cavity liner, steel framing, miscellaneous platforms, pipe whip restraints, and supports for cable trays, conduits, ventilation ducting, piping, and other components. The internal structures are supported on the concrete floor fill placed in the bottom of the steel containment vessel. The RCS is located within the compartments formed by the concrete fill floor, the primary and secondary shield walls, and the concrete enclosures around the steam generators and the pressurizer.

Concrete. The shield walls are thick, cylindrical reinforced concrete walls that enclose the reactor vessels and provide biological shielding and structural support. The shield walls also act as a missile barrier. The refueling cavity is a stainless steel lined, reinforced concrete structure that forms a pool above the reactor when it is filled with borated water for refueling.

All high-pressure equipment and high-energy RCS piping and components which could generate missiles as a result of a design basis accident are surrounded by barriers. These barriers, principally the primary and secondary shield walls, prevent such missiles from damaging the containment vessel, piping penetrations, and the required ESF systems.

Concrete walls, floors, beams, equipment pads, and other miscellaneous concrete components are of conventional reinforced concrete design.

Steel.

Reactor Cavity Sumps: The floors and walls of each unit's reactor cavity are lined with stainless steel. The floor is sloped to drain all leakage to the reactor cavity sump. The reactor cavity sump is located below the reactor cavity outside the primary shield wall.

Containment Sumps: The containment sumps are provided to collect water for recirculation through the shutdown cooling heat exchangers after a LOCA. The containment sumps are located below the lowest floor elevation inside the containment except for the reactor cavity and

the reactor cavity sump. Vent openings in the secondary shield wall direct water into the containment sump. Drains from the containment sump to the reactor cavity sump prevent accumulation of water in the containment. Screens are provided for the containment sumps to prevent debris from entering the sumps and the ECCS.

Reactor Coolant System Supports: The RCS supports that are subject to an AMR include the reactor vessel supports, steam generator supports, pressurizer supports, and RCP supports. The RCS supports are designed to resist operating loads, pipe ruptures, and seismic loads.

The RCS support boundaries that are subject to an AMR include all structural support items between the RCS components and the containment concrete structure, up to and including, integral attachments that are on RCS components.

Miscellaneous Steel and Component Supports: Miscellaneous and structural steel are provided in each containment to allow access to the various elevations and areas for inspection and maintenance. The structural steel provides support for safety-related and non-safety-related systems and components, including piping, ducts, miscellaneous equipment, electrical cable trays and conduit, instruments and tubing, electrical and instrumentation enclosures and racks, steel beams and columns, stairways, ladders, and attachments to concrete walls and liners.

2.4.1.3.2 Staff Evaluation

The staff reviewed Section 2.4.1.3 of the LRA and the associated license renewal boundary drawings to determine whether there is reasonable assurance that the applicant appropriately identified the interior SCs of the containment vessels and reactor containment shield buildings that are within the scope of license renewal in accordance with 10 CFR 54.4(a). The staff then reviewed the AMR results provided in Table 3.5-2 of the LRA to determine whether the applicant adequately identified the components of the interior SCs of the containment vessels and reactor containment shield buildings that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff sampled the interior SCs of the containment vessels and reactor containment shield buildings that were not listed in Table 3.5-2 to verify that the applicant properly identified the components that meet the above requirements. The staff also reviewed Section 3.8.3 of the UFSARs for Units 1 and 2 and did not identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.4.1.3 of the LRA.

During the review, the staff determined that additional information was needed to complete its evaluation of the interior components of the containment vessels and reactor shield building structure. In a letter dated July 1, 2002, the staff requested that the applicant justify the omission of insulation from the scope of license renewal and subject to an AMR (RAI 2.4.1-5). Thermal insulation is typically present on major components of the reactor, pipes, and valves; pipe and equipment component supports; and structural enclosures and panels used to shelter instruments and electrical equipment. No insulation material is shown in Table 3.5-2 of the LRA as within the scope of license renewal. The temperature control intended function provided by insulating materials is important for environmental qualification, as piping and components with degraded insulation will experience additional heat loads and condensation.

By letter dated October 3, 2002, the applicant responded that thermal insulation is not within the scope of license renewal because it does not perform or support any license renewal intended functions that satisfy the scoping criteria of 10 CFR 54.4(a). Environmental temperature qualification of in-containment components is maintained through temperature monitoring and the Units 1 and 2 technical specifications (Section 4.4, page 4.4-3 of the LRA). The insulation provides a negligible heat transfer effect with regard to containment heat loads following design basis accidents. Additionally, no insulation is credited in the environmental qualification of individual components such as insulation boxes.

During the NRC scoping and screening inspection conducted in the week of October 21-25, 2002 as documented in Inspection Report 2002-07 dated November 27, 2002, the staff confirmed that insulation is not credited for temperature control or for environmental qualification at Units 1 and 2. For example, the insulation used in the main control room envelope or the rooms cooled by the portion of HVAC system for emergency core cooling systems (ECCS) areas was not credited for temperature maintenance in SBO heatup analysis. Insulation used for protection of electrical panels in post-accident harsh environments also was not credited in any environmental qualification analyses.

On the basis that insulation does not perform or support any intended function meeting the criteria of 10 CFR 54.4(a), the staff finds the applicant's response to be acceptable. The staff agrees with the applicant that insulation described above should not be included in the scope of license renewal and not subject to an AMR for Units 1 and 2.

The staff's review found that the interior SCs of the containment vessels and reactor shield buildings that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.1.3.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant appropriately identified the containment vessels and reactor containment shield buildings structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.4.2 Other Structures

The applicant has identified the following structures as subject to an AMR in this section:

- component cooling water areas
- condensate polisher building
- condensate storage tank enclosures
- diesel oil equipment enclosures
- emergency diesel generator buildings
- fire rated assemblies
- fuel handling buildings
- fuel handling equipment
- intake, discharge, and emergency cooling canals

- intake structures
- RABs
- steam trestle areas
- turbine buildings
- ultimate heat sink dam
- yard structures

2.4.2.1 Component Cooling Water Areas

In Section 2.4.2.1 of the LRA, the applicant described the SCs of the component cooling water areas that are within the scope of license renewal and subject to an AMR. The component cooling water areas are further described in Section 9.2.2 and Appendix 9.5A of the UFSAR for Unit 1 and Section 3.4 of the UFSAR for Unit 2.

2.4.2.1.1 Technical Information in the Application

The Unit 1 and Unit 2 component cooling water areas house the safety-related component cooling water pumps and heat exchangers, and are designed to seismic Category 1 requirements.

The Unit 1 component cooling water area is an outdoor area, exposed to the environment, with pumps and heat exchangers supported on concrete pedestals well above flood and wave run-up elevations. Steel missile barriers are provided over the pumps.

The Unit 2 component cooling water area consists of an enclosed concrete building. The component cooling water pumps and heat exchangers are housed in a rectangular reinforced concrete missile protection structure. The structure consists of a base mat, exterior walls, and a concrete roof slab, supported on the exterior walls and on reinforced concrete columns. The Unit 2 component cooling water system equipment susceptible to flood damage is protected by locating all safety-related components above the maximum expected water level and wave run-up during a probable maximum hurricane.

The applicant lists the following SCs of the component cooling water areas subject to an AMR in LRA Table 3.5-3: non-safety-related pipe segments between class break and seismic anchor, Unit 1 missile barriers, Unit 2 missile protection doors, conduits, conduit supports, electrical and instrument panels and enclosures, electrical and instrument panel and enclosure supports, HVAC duct supports, tubing supports, passive components of the trolley hoists, reinforced concrete above groundwater (external surfaces of foundation slab and walls below grating, walls and roofs above grating), reinforced concrete (equipment pedestals and internal surfaces of walls and foundation slabs below grating). The applicant also lists the following intended functions of these components in LRA Table 3.5-3:

- provide structural support to safety-related components
- provide shelter/protection to safety-related components
- provide missile barriers
- provide fire barriers to retard spreading of a fire
- provide structural support to non-safety-related components whose failure could prevent satisfactory accomplishment of the intended functions of safety-related SCs

- provide flood protection barriers
- provide structural support and/or shelter to components required for FP

2.4.2.1.2 Staff Evaluation

The staff reviewed Section 2.4.2.1 of the LRA to determine whether the applicant adequately identified the SCs of the component cooling water areas that are within the scope of license renewal in accordance with 10 CFR 54.4(a). The staff then reviewed the AMR results provided in LRA Table 3.5-3 to determine whether the applicant adequately identified the SCs belonging to the component cooling water areas that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff sampled the SCs of the component cooling water areas that were not listed in LRA Table 3.5-3 to verify that the applicant properly identified the components that meet the above requirements. The staff also reviewed Sections 3.3, 3.4, 3.5, and 9.2.2 and Appendicies 3F and 9.5A of the UFSAR for Unit 1, and Section 3.4 of the UFSAR for Unit 2, and did not identify any intended system functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.4.2.1 of the LRA.

During the review, the staff questioned the applicant's omission of the component cooling water area sump from Table 3.5-3 during a meeting with the applicant held on June 10 through 11, 2002. As documented in the meeting summary dated July 31, 2002, the applicant explained that the component cooling water area sump was actually a recess in the foundation slab that was scoped and screened as a yard structure in LRA Table 3.5-16, and as such is identified as a reinforced concrete pipe trench on page 3.5-93. This explanation is acceptable to the staff, as it explains that the sump is subject to an AMR.

The staff's review found that the SCs of the component cooling water areas that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.2.1.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriatedly identified the component cooling water areas structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.4.2.2 Condensate Polisher Building

In Section 2.4.2.2 of the LRA, the applicant identifies the SCs of the condensate polisher building that are within the scope of license renewal and subject to an AMR. This building is common to both St. Lucie Units 1 and 2. The FP areas of the condensate polisher building is described in Appendix 9.5A, Section 4.0, of the St. Lucie Unit 1 UFSAR.

2.4.2.2.1 Technical Information in the Application

The condensate polishing building is a reinforced concrete building shared in common by both Units 1 and 2. This building is within the scope of license renewal because it provides structural support and/or shelter to a fire hose station designated as Fire Zone 15A in the St. Lucie FP

program and it contains FP equipment and components. The condensate polisher building has no other intended function and does not contain safety-related components.

The condensate polisher building structural component types that are subject to an AMR are listed in Table 3.5-4 of the LRA as follows: component supports (non-safety-related), pipe supports (non-safety-related), reinforced concrete above groundwater. The intended functions of these component types are also listed in Table 3.5-4 as structural support and/or shelter to components required for FP, ATWS, and/or SBO events.

2.4.2.2.2 Staff Evaluation

The staff reviewed Section 2.4.2.2 of the LRA and Appendix 9.5A and Section 4.0 of the UFSAR for Unit 1 to determine whether the SCs of the condensate polisher building within the scope of license renewal and subject to an AMR have been identified in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively. The staff focused on SCs that were not identified as being subject to an AMR to determine whether any components were omitted.

The staff observed that the only information supplied for the condensate polisher building in Appendix 9.5A, Section 4.0, of the Unit 1 UFSAR as referenced by Section 2.4.2.2 of the LRA, is an identification of the FP areas in this building. A small amount of additional information is presented in Section 1.2-6, page 1.2-23, of the Unit 1 UFSAR and Section 1.2-4, page 1.2-14, of the Unit 2 UFSAR. The staff was unable to determine whether the SCs of the condensate polisher building within the scope of license renewal were appropriately identified by the applicant in Table 3.5-4 of the LRA. Therefore, during a meeting dated June 10, 2002, the staff requested that the applicant provide more information about the condensate polisher building and the equipment housed within the building (RAI 2.4.2.2-1).

The applicant replied that the condensate polishing building contains no safety-related equipment. The applicant further stated that the condensate polisher building is within the scope of license renewal because a fire hose station and some FP equipment are located in the building. The staff requested that the NRC inspection team confirm these statements during on-site scoping and screening inspection, conducted October 21-25, 2002. As documented in Inspection Report 2002-07, dated November 27, 2002, the inspection included a walk down of the condensate polisher building.

The inspection determined that the condensate polisher building was built after Unit 1 was initially licensed. The purpose of the structure is to house the condensate polisher system, which is not within the scope of license renewal. In addition, the building contains lighting, domestic water, ventilation, communication, crane, and FP systems. The applicant identified the FP system as being within the scope of license renewal in accordance with 10 CFR 55.4(a)(iii) for regulated events. Results of the inspection concluded that the applicant had appropriately identified the SCs that are within the scope of license renewal for the condensate polisher building.

The staff's review found that the SCs of the condensate polisher building that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.2.2.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the condensate polisher building structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.4.2.3 Condensate Storage Tank Enclosures

In Section 2.4.2.3 of the LRA, the applicant identifies the SCs of the CST enclosures that are within the scope of license renewal and subject to an AMR. The Unit 1 CST enclosure is described in Section 3.5.4.2, Appendix 3F, Section 4.3.5, and Appendix 9.5A of the Unit 1 UFSAR. The Unit 2 CST enclosure is described in Section 3.8.4.1.7 and Appendix 9.5A of the Unit 2 UFSAR.

2.4.2.3.1 Technical Information in the Application

The Unit 1 and Unit 2 CST enclosures are cylindrical reinforced concrete structures designed to seismic Category 1 requirements for the intended function of tornado missile protection.

The Unit 1 CST enclosure is contained in an open-roof structure enclosed by steel framing across the top supporting a steel grating security barrier. The structure is supported on a reinforced concrete base mat. This structure was designed to protect against horizontal missiles.

The Unit 2 CST enclosure is equipped with a precast concrete dome roof overlaid with reinforced concrete that protects the tank from both horizontal and vertical missiles. The structure is supported on a reinforced concrete base mat.

The steel CSTs are bolted to reinforced concrete ring wall pedestals
that are supported on the base mats. The tank bottoms are supported on a Class 1 structural fill that is enclosed within the concrete ring walls.

The structure and component types of the CST enclosure subject to an AMR are listed in Table 3.5-5 of the LRA as follows: structural steel framing (columns, beams, connections, etc.), stairs, ladders, platforms, handrails, checkered plate grating, component supports (non-safety-related), safety-related pipe supports and component supports, non-safety-related pipe supports, non-safety-related pipe segments between class break and seismic anchor, conduits, conduit supports, electrical and instrument panels and enclosures, electrical and instrument panel and enclosure supports, electrical and instrument panel and enclosure supports, tubing supports, missile protection hood (Unit 2 only), reinforced concrete above groundwater.

The following intended functions of the SCs of the CST enclosure subject to an AMR are listed in Table 3.5-5 of the LRA:

- provide structural support to safety-related components
- provide shelter/protection to safety-related components
- provide fire barriers to retard spreading of a fire
- provide missile barriers

- provide structural support to non-safety-related SCs whose failure could prevent satisfactory accomplishment of the intended functions of safety-related SCs
- provide structural support and/or shelter to components required for FP, ATWS, and/or SBO events

2.4.2.3.2 Staff Evaluation

The staff reviewed Section 2.4.2.3 of the LRA; Section 3.5.4.2, Appendix 3F, Section 4.3.5 and Appendix 9.5A of the Unit 1 UFSAR; and Section 3.8.4.1.7 and Appendix 9.5A of the Unit 2 UFSAR to determine whether there is reasonable assurance that the CST enclosure structural components within the scope of license renewal and subject to an AMR have been appropriately identified in accordance with 10 CFR 54.4(a) and 54.21(a)(1). The staff also focused on components that were not identified as being subject to an AMR to determine whether any components were omitted.

During a meeting with the applicant on June 10, 2002, the staff referred to Section 2.4.2.3 of the LRA that states:

> The steel CSTs are bolted to reinforced concrete ring wall pedestals that are supported on the base mats. The tank bottoms are supported on Class 1 structural fill that is enclosed within the concrete ring walls.

However, bolts and base mats are not identified in Table 3.5-5 of the LRA that lists the CST enclosure SCs within the scope of license renewal.

As documented in the summary of the June 10, 2002 meeting dated July 31, 2002, the applicant responded that reinforcing steel and embedded steel are evaluated with the concrete components in which they are embedded. The base mats are concrete. The bolts and base mats are included in Table 3.5-5 of the LRA as part of the commodity group, “reinforced concrete above groundwater.”

The staff finds the applicant’s response acceptable, on the basis that it clarifies that the applicable components are within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

The staff’s review found that the SCs of the CST enclosures that have intended functions meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.2.3.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the CST enclosures structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.4.2.4 Diesel Oil Equipment Enclosures

In Section 2.4.2.4 of the LRA, the applicant identifies the SCs of the diesel oil equipment enclosures that are within the scope of license renewal and subject to an AMR. This system is further described in Section 9.5.4 of the UFSARs for Units 1 and 2.

2.4.2.4.1 Technical Information in the Application

The Unit 1 diesel oil equipment enclosures consist of complete enclosures for the diesel oil transfer pumps and a partial enclosure for the diesel oil storage tanks. The diesel oil transfer pumps are protected from the environment and external missiles by reinforced concrete seismic Category 1 enclosures. The Unit 1 diesel oil storage tanks are located outdoors on concrete foundations surrounded by a reinforced concrete containment wall to contain the diesel oil in the event of overflow or rupture.

The Unit 2 diesel oil transfer pumps and diesel oil storage tanks are located within a fully-enclosed reinforced concrete seismic Category 1 structure. The structure is divided into two distinct compartments by an interior reinforced concrete missile shield wall.

The applicant lists the following structure and component types of the diesel oil equipment enclosure subject to an AMR in Table 3.5-6 of the LRA: stairs, ladders, platforms, handrails, checkered plate grating, pipe and component supports, non-safety-related pipe supports, non-safety-related pipe segments between class break and seismic anchor, conduits, conduit supports, electrical and instrument panels and enclosures, electrical and instrument panel and enclosure supports, miscellaneous steel (Unit 2 missile barrier doors), diesel oil storage tanks, reinforced concrete above groundwater.

The SCs of the diesel oil equipment enclosures have the following intended functions as listed in Table 3.5-6 of the LRA:

- provide structural support to safety-related components
- provide shelter/protection to safety-related components
- provide fire barriers to retard spreading of a fire
- provide missile barriers
- provide structural support to non-safety-related structures or components whose failure could prevent satisfactory accomplishment of the intended functions of safety-related structures or components
- provide flood protection barrier
- provide structural support and/or shelter to components required for FP and/or SBO (Unit 2 enclosure for a Unit 1 SBO)

2.4.2.4.2 Staff Evaluation

The staff reviewed Section 2.4.2.4 of the LRA, and Section 9.5.4 of the UFSAR for Units 1 and 2 to determine whether there is reasonable assurance that the SCs of the diesel oil equipment enclosures within the scope of license renewal and subject to an AMR have been appropriately identified in accordance with 10 CFR 54.4(a) and 54.21(a)(1). The staff also focused on SCs that were not identified as subject to an AMR to determine whether any SCs were omitted.

The staff's review found that the SCs of the diesel oil equipment enclosures that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.2.4.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the diesel oil equipment enclosures structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.4.2.5 Emergency Diesel Generator Buildings

In Section 2.4.2.5 of the LRA, the applicant identifies the SCs of the emergency diesel generator buildings that are within the scope of license renewal and subject to an AMR. The emergency diesel generator buildings are described in Sections 3.8.1.1.3, 3.8.1.7.4, 8.3, 9.4.7, and 9.5 of the Unit 1 UFSAR, and Sections 3.8.4.1.4, 8.3, 9.4.5, and 9.5 of the Unit 2 UFSAR.

2.4.2.5.1 Technical Information in the Application

Both the Unit 1 and the Unit 2 emergency diesel generator buildings are seismic Category 1 reinforced concrete structures, housing duplicate diesel generating units, each separated by an interior reinforced concrete wall. Each emergency diesel generator building consists of a base mat, exterior walls, one interior wall separating the units, and a concrete roof. Concrete pedestals on the base mat support the diesel generator sets. The emergency diesel generator buildings also house the components of the diesel generator subsystems, such as the diesel engine and air systems, fuel and lube oil systems, cooling water systems, and the diesel oil system.

The applicant lists the following SCs of the emergency diesel generator building subject to an AMR and the component intended functions in Table 3.5-7: stairs, ladders, platforms, checkered plate, grating, component supports (non-safety-related), safety-related pipe supports and component supports, non-safety-related pipe supports, conduits, conduit supports, electrical and instrument panels and enclosures, electrical and instrument panel and enclosure supports, tubing supports, miscellaneous steel, missile protection doors, missile protection exhaust hoods (Unit 2 only), exterior louvers (for ventilation and missile protection - Unit 1 only), trolley hoists (passive components), reinforced concrete above groundwater (slabs, walls, roofs, trenches).

Table 3.5-7 also lists the following intended functions of the SCs of the emergency diesel generator buildings:

- provide structural support to safety-related component
- provide shelter/protection to safety-related components
- provide fire barriers to retard spreading of a fire
- provide missile barriers

- provide structural support to non-safety-related structures or components whose failure could prevent satisfactory accomplishment of the intended functions of safety-related structures or components
- provide flood protection barriers
- provide structural support and/or shelter to components required for FP and/or SBO

2.4.2.5.2 Staff Evaluation

The staff reviewed Section 2.4.2.5 of the LRA; Sections 3.8.1.1.3, 3.8.1.7.4, 8.3, 9.4.7, and 9.5 of the Unit 1 UFSAR; and Sections 3.8.4.1.4, 8.3, 9.4.5, and 9.5 of the Unit 2 UFSAR to determine whether there is reasonable assurance that the SCs of the emergency diesel generator buildings have been adequately identified within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively. The staff also focused on components that were not identified as subject to an AMR to determine if any components were omitted.

In a meeting with the applicant that took place on June 10, 2002, the staff referred to Section 2.4.2.5 of the LRA, which states that the emergency diesel generator buildings are in the scope of license renewal, in part, because they are flood protection barriers. In Table 3.5-7 of the LRA, the intended function of flood protection barriers is identified for (a) reinforced concrete above ground, and (b) missile protection doors. The staff asked how these doors function for flood protection. Any special features of these doors that serve for flood protection, such as gaskets, should be listed in Table 3.5-7.

As documented in the summary of the June 10, 2002 meeting dated July 31, 2002, the applicant responded that all permanent door openings in the exterior walls of the emergency diesel generator building are constructed with swing-type doors for protection from rain, wind, and other atmospheric effects. The access doors do not have weather-stripping in all cases, however, the amount of leakage-induced flooding through these doors is not more adverse than that considered in the analysis presented in Section 3.1.3 of Chapter 9.5A of the UFSAR on the rupture of non-seismic Class 1 equipment (fire system piping).

As a follow-up on this issue, the staff asked the applicant to justify the omission of the emergency diesel building floor drains from the scope of license renewal by letter dated July 29, 2002 (RAI 2.2-2). This RAI referred, in part, to page 3.6F-7 of the Unit 2 UFSAR, which credits the floor drains in the internal flooding analysis for the Unit 2 diesel generator building.

By letter dated October 3, 2002, the applicant responded by presenting the results of a reevaluation of internal flooding of the diesel generator building that did not credit the availability of the floor drains. The applicant stated that the flood elevation resulting from a crack in the service water line would reach only a few inches above the floor level, even assuming a complete blockage of the floor drains. This analysis credits drainage through the opening under the doors in each room of the building. This flooding elevation is well below the elevation of the safety-related components in the diesel generator buildings. Accordingly, the Unit 2 emergency diesel generator building floor drains do not perform an intended function that satisfies the scoping criteria of 10 CFR 54.4(a).

The staff finds the applicant's response to this portion of RAI 2.2-2 to be acceptable, on the basis that the Unit 2 emergency diesel generator building floor drains do not perform any intended function as specified in 10 CFR 54.4(a).

The staff's review found that the SCs of the emergency diesel generator buildings that have intended functions meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.2.5.3 Conclusions

On the basis of this review, the staff concludes that there is reasonable assurance that the applicant has appropriately identified the SCs of the emergency diesel generator buildings that are within the scope of license renewal, as required by 10 CFR 54.4(a), and subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.2.6 Fire Rated Assemblies

In Section 2.4.2.6 of the LRA, the applicant identifies the SCs of the fire rated assemblies that are within the scope of license renewal and subject to an AMR. The fire rated assemblies are described in Appendix 9.5A and Sections 3.11 through 3.14 of the St. Lucie UFSARs for both units.

2.4.2.6.1 Technical Information in the Application

Fire rated assemblies are required as part of the plant's FP program in accordance with 10 CFR 50.48. Fire rated assemblies at St. Lucie Units 1 and 2 include fire barriers, fire doors, fire dampers, and penetration seals.

In Section 2.4.2.6 of the LRA, the applicant discusses the need for fire barriers to retard the spread of fire and states that fire-resistant panels (e.g., Thermo-lag, sheet metal/ceramic fiber) mounted on steel framing are used as fire barriers. Section 2.4.2.6 further references Table 3.5-8 of the LRA and Appendix 9.5A of the Unit 1 and 2 UFSARs, which state that barriers (e.g., wall, floors, ceiling) divide the plant into fire areas. In Table 3.5-8 of the LRA, the applicant notes that concrete and steel structural components that serve as fire barriers are addressed with each structure.

The applicant listed the fire rated assemblies SCs requiring an AMR in Table 3.5-8 as: conduit caps, fire wrap (conduit and steel supports), conduit plugs, miscellaneous barriers (Thermo-lag panels, wrap, sprays, or troweled, ceramic and steel panels), fire doors (Appendix R barriers, airtight and watertight), flame impingement shields, fire sealed isolation joint, mechanical penetrations, cable tray penetrations. The intended functions of these SCs is listed as: pressure boundary, fire barrier, and flood protection barrier.

2.4.2.6.2 Staff Evaluation

The staff reviewed Section 2.4.2.6 of the LRA and the associated license renewal boundary drawings to determine whether there is reasonable assurance that the applicant appropriately

identified the portions of the fire rated assemblies that are within the scope of license renewal in accordance with 10 CFR 54.4(a). The staff reviewed Table 3.5-8 of the LRA to determine whether the applicant appropriately identified the components belonging to the fire rated assemblies that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the fire rated assemblies that were not listed in Table 3.5-8 to verify that the applicant properly identified the components that meet the above requirements. The staff also reviewed Appendix 9.5A of the Unit 1 and 2 UFSARs and did not identify any system intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.4.2.6 of the applicant's LRA.

Fire barriers are provided to ensure that the function of one train of redundant equipment necessary to achieve and maintain safe shutdown conditions remains free of fire damage. Fire barriers provide a means of limiting fire travel by compartmentalization and containment. St. Lucie Units 1 and 2 fire barriers include walls, floors, ceilings, radiant energy shields, flame impingement shields, conduit fire wrap, and conduit plugs. Wall-type barriers and shields include concrete and masonry walls. Fire-resistant panels (e.g., Thermo-lag, sheet metal/ceramic fiber) mounted on steel framing are also used as fire barriers. Concrete and masonry walls, floors, and ceilings are evaluated with the specific structure in which they reside.

Fire door assemblies prevent the spread of fire through fire barrier passageways. Fire dampers are provided to prevent the spread of fire through ventilation penetrations. Fire dampers are evaluated with ventilation in Section 2.3.3.15 of the LRA.

Penetration seals are provided to maintain the integrity of fire barriers at barrier penetrations. The types of materials used for the various penetrations range from silicone gels for piping and heating, ventilation and air conditioning (HVAC) penetrations to grouts for conduit and plumbing. Cable tray penetrations are sealed with Marinite board, ceramic fiber filler material, and a protective-fire retardant cable coating.

Although reference is made to structural steel for each structure discussed in the civil/structural sections of the LRA, no reference is made to the fire-resistive coverings on any structural steel in those structures. In a letter dated July 18, 2002, the applicant was asked to verify whether any structural steel fire barrier has been provided with fire-resistive coverings and if any barriers are identified, justify why structural steel fire barriers provided with fire-resistive coverings are considered outside the scope of license renewal or are not subject to an AMR (RAI 2.4.2-1).

By letter dated October 3, 2002, the applicant responded that safety-related structures for St. Lucie Units 1 and 2 (e.g., RABs, fuel handling buildings, emergency diesel generator buildings, component cooling water areas, diesel oil equipment enclosures, etc.) are cast-in-place, reinforced concrete structures. The only steel-framed structure is the non-safety-related turbine building, which does not include fire resistive coverings.

Structure steel is utilized in the construction of certain fire barriers. Note 1 on Table 3.5-8 refers to the structural steel framing listed in Tables 3.5-2 and 3.5-12 of the LRA. This steel framing provides the structural framework for the miscellaneous barriers listed in Table 3.5-8. Therefore, all structural steel fire barriers are included in the scope of license renewal and included in Table 3.5-8.

The staff finds the applicant's response to RAI 2.4.2-1 to be acceptable, on the basis that all structural steel fire barriers are included are included within the scope of license renewal and subject to an AMR, in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

The staff review found that the components of the fire rated assemblies that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.2.6.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the fire rated assemblies structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.4.2.7 Fuel Handling Buildings

In Section 2.4.2.7 of the LRA, the applicant identifies the SCs of the fuel handling building that are within the scope of license renewal and subject to an AMR. The buildings are further described in Section 3.8.1.1.2 of the Unit 1 UFSAR and Section 3.8.4.1.3 of the Unit 2 UFSAR. This section of the LRA also contains the scoping and screening results for the fuel handling equipment and tools located in the fuel handling building. These tools and equipment are described in Section 2.4.2.8 of the LRA.

2.4.2.7.1 Technical Information in the Application

Each fuel handling building is a seismic Category 1 reinforced concrete structure. The fuel handling buildings each contain a spent fuel pool, a stainless steel lined, reinforced concrete tank structure that provides space for the storage of spent fuel, spent fuel casks, and miscellaneous items. The fuel handling buildings consist of concrete exterior walls with reinforced concrete interior walls. The floor and roof for the fuel handling buildings are of beam and girder construction supported by columns.

The applicant listed the structure and component types of the fuel handling building which require an AMR in Table 3.5-9 of the LRA. Table 3.5-9 also contains fuel handling equipment and tools located in the fuel handling building, which are described in Section 2.4.2.8 of the LRA. The list in Table 3.5-9 includes: structural steel framing (columns, beams, connections, etc.), stairs, ladders, platforms, handrails, checkered plate, grating, component supports (non-safety-related), safety-related pipe supports and component supports, non-safety-related pipe supports, non-safety-related pipe segments between class break and seismic anchor, miscellaneous steel (radiation shielding, missile barriers, hatch frame covers, etc.), airtight doors, conduits, conduit supports, electrical and instrument panels and enclosures, electrical and instrument panel and enclosure supports, HVAC duct supports, HVAC louver (Unit 2 only), tubing supports, fuel transfer tube penetration sleeve, trolley hoists and cranes (passive components), spent fuel cask handling cranes (passive components), spent fuel handling machines (passive components), fuel pool gates, fuel transfer tubes and expansion bellows, pool liner plates, fuel handling tools (Unit 2 only), passive components of the fuel assembly

upender (Unit 2 only), spent fuel storage racks, Boraflex (Unit 1 only), reinforced concrete above groundwater, unreinforced concrete masonry block walls, cask removal L-shape hatches, airtight door seals, and weatherproofing.

The list of SCs subject to an AMR is specific for each unit because of differences in the CLB. That is, for a worse case scenario, the Unit 1 FHA assumes a ground level release, while the Unit 2 analysis credits the fuel handling building HVAC system, fuel handling building cranes and hoists, and proper functioning of the fuel handling equipment and tools for accident mitigation.

Table 3.5-9 of the LRA also lists the following intended functions for SCs:

- provide pressure boundary
- provide structural support to safety-related components
- provide shelter/protection to safety-related components
- provide fire barriers to retard spreading of a fire
- provide missile barriers
- provide structural support to non-safety-related components whose failure could prevent satisfactory accomplishment of the intended functions safety-related structures or components
- provide flood protection barriers
- provide a boundary for safety-related ventilation

2.4.2.7.2 Staff Evaluation

The staff reviewed Section 2.4.2.7 of the LRA, Section 3.8.1.1.2 of the Unit 1 UFSAR and Section 3.8.4.1.3 of the Unit 2 UFSAR to determine whether the SCs of the fuel handling buildings within the scope of license renewal and subject to an AMR have been adequately identified in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively. The staff also focused on components that were not identified as being subject to an AMR to determine whether any components were omitted.

During the review, the omission of an intended function was identified by the staff. By letter dated July 18, 2002, the staff requested that the applicant justify the omission of maintaining subcritical conditions as an intended function for spent fuel racks containing Boraflex and other fuel handling equipment and tools (RAI 2.4.2-3). Section 9.1 of the UFSARs for Units 1 and 2 states that the fuel storage racks are designed to maintain subcritical conditions in the fuel pool. However, Section 2.4.2.7 of the LRA does not list maintaining subcritical conditions as one of the attributes of the fuel handling building. In addition, none of the components or commodity groups listed in Table 3.5-9 of the LRA is credited with the intended function of maintaining subcritical conditions.

By letter dated October 3, 2002, the applicant responded that structural components of the fuel handling buildings that ensure the spent fuel remains sub-critical (spent fuel racks and boraflex) are identified in Table 3.5-9 of the LRA. These structural components have the intended function (with number 3), "Provide shelter/protection to safety-related components (including radiation shielding)." This Intended function (also numbered 3 in Table 3.5-1 of the LRA) is supplemented to include maintaining subcritical conditions. The staff finds the applicant's

response to be acceptable, on the basis that it identifies maintaining subcritical conditions as an intended function in accordance with the requirements of 10 CFR 54.21(a)(1).

In a letter dated July 18, 2002, the staff asked the applicant to justify the omission of the fuel handling building ventilation stacks from being subject to an aging management review (RAI 2.4.2-4). The fuel handling building ventilation stacks are components of the fuel building ventilation systems, but are also large structures attached to the exterior of the fuel buildings. Failure of these structures could damage nearby safety-related structures and components. In the LRA, the applicant states that these components are not within the scope of license renewal and not subject to an aging management review. This concern is similar to the issue raised by the staff in RAI 2.4.1-6 for the main plant vent stacks in Section 2.4.1.2.2 of this SER.

The applicant responded to RAI 2.4.2-4 by letter dated October 3, 2002. The response stated that the failure of the fuel building vent stacks would not damage any safety-related structures or components as the impact energy of high energy missiles analyzed in the UFSAR bounds the impact energy of a falling fuel building ventilation stack. The applicant justified this statement quantitatively with an analysis discussed in the response to RAI 2.4.1-6. The staff finds the applicant's response to RAI 2.4.2-4 to be acceptable, on the basis that (1) the fuel building vent stacks do not have an intended function meeting the criteria of 10 CFR 54.4(a), and (2) the failure of the fuel building vent stacks would not result in potential spatial interactions that could cause the failure of safety-related structures or components. The staff therefore agrees with the applicant's conclusion that the fuel building vent stacks for Units 1 and 2 do not need to be included within the scope of license renewal and are not subject to an aging management review.

In a letter dated July 18, 2002, the staff asked the applicant to clarify if the Unit 1 fuel pool bulkhead monorail is included in Table 3.5-9 of the LRA as a component of the component group "trolley hoists and cranes" (RAI 2.4.2-5). By letter dated October 3, 2002, the applicant stated that the Unit 1 fuel pool bulkhead monorail is in the component group "trolley hoists and cranes" listed in Table 3.5-9. The staff finds this response acceptable, on the basis that it clarifies that these components are subject to an aging management review.

The staff's review found that the SCs of fuel handling building that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.2.7.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the fuel handling buildings structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.4.2.8 Fuel Handling Equipment

In the LRA, fuel handling equipment is evaluated with the structure where it is located. Section 2.4.2.8 of the LRA provides a brief technical description of the fuel handling equipment for Units 1 and 2, but refers to Sections 2.4.1 and 2.4.2.7 of the LRA, containments and fuel

handling buildings, respectively, for identification of specific fuel handling equipment components that are within the scope of license renewal and subject to an AMR. The fuel handling equipment is described in Section 9.1 of the UFSARs for Units 1 and 2.

2.4.2.8.1 Technical Information in the Application

Fuel handling equipment is an integrated system of equipment for refueling the reactor that provides for handling and storage of fuel assemblies from receipt of new fuel to shipping of spent fuel. The UFSARs state that this equipment is designed to remove and install fuel assemblies at each operating location in the core, safely handle and store fuel assemblies and control element assemblies, safely remove, replace and store reactor internals, and minimize the probability of malfunction or operator initiated actions that could cause fuel damage, and potential fission product release or reduction of shielding water coverage.

The major fuel handling equipment includes: the reactor cavity seal rings, the manipulator cranes, the fuel transfer system, the spent fuel bridge cranes, the fuel handling tools, and the spent fuel cask crane. The fuel handling equipment is located in the containment or in the fuel handling buildings.

As identified by the applicant in Table 3.5-2 of the LRA, each containment houses and supports fuel handling equipment required for plant refueling, including the following components that are in the scope of license renewal and subject to an AMR: the refueling machine; the fuel transfer system (Unit 2 only); passive components of the polar crane, the telescoping jib crane, and other cranes and hoists; the reactor cavity seal rings; and one end of the fuel transfer tube including penetration sleeves, bellows, flange supports and flexible membranes (in the annulus).

As identified by the applicant in Table 3.5-9 of the LRA, the fuel handling building contains the following fuel handling equipment within the scope of license renewal and subject to an AMR: the other end of the fuel transfer tube; fuel handling tools (Unit 2 only), and passive components of the spent fuel handling machines, the spent fuel cask crane, the trolley hoists and cranes, and the upender (Unit 2 only).

Some of the components identified above are designated as applying to Unit 2 only. As discussed in Section 2.1.1.2 of the LRA, the radiological consequences of the Unit 1 design basis FHA are a small fraction of the 10 CFR 100 offsite dose limits. Section 15.4.1 of the Unit 1 UFSAR states that the system is not relied on or credited in the safety analyses for FHAs. Therefore, these Unit 1 fuel handling components do not meet the scoping criteria of 10 CFR 54.4(a)(1)(iii) and as such, are not within the scope of license renewal.

In Tables 3.5-2 and 3.5-9 of the LRA, the applicant identified the intended functions for fuel handling equipment components subject to an AMR as pressure boundary, structural support, shelter/protection (including radiation shielding).

2.4.2.8.2 Staff Evaluation

The staff reviewed Section 2.4.2.8 of the LRA and Section 9.1 of the UFSAR for both St. Lucie units to determine whether there is reasonable assurance that the fuel handling equipment

within the scope of license renewal and subject to an AMR have been adequately identified in accordance with 10 CFR 54.4 and 54.21(a)(1), respectively.

In the performance of the review, the staff selected system functions described in the UFSAR that were required by 10 CFR 54.4 to verify that components having intended functions were not omitted from the scope of the rule. The staff also focused on components that were not identified as being subject to an AMR to determine if any components were omitted.

The staff review of the LRA did not identify any omissions of structures, systems, or components that should be within the scope of license renewal and subject to an AMR. The staff review confirmed that equipment such as the cranes and hoists associated with handling fuel and other heavy loads in the vicinity of the spent fuel pool, new fuel storage racks and reactor were in the scope of license review and subject to an AMR.

By letter dated July 18, 2002, the staff requested that the applicant provide specific information concerning the intended functions for the fuel storage racks. Specifically, the staff asked the applicant to provide justification for not listing the maintenance of subcritical conditions as an intended function for any of the components of the fuel handling building in Table 3.5-9 of the LRA (RAI 2.3-1).

By letter dated October 3, 2002, the applicant responded that the structural components of the fuel handling buildings that ensure spent fuel remains subcritical (spent fuel racks and boraflex) are identified in Table 3.5-9 of the LRA. In Table 3.5-9, these structural components are identified as performing intended function number 3, "Provide shelter/protection to safety-related components (including radiation shielding)." This intended function includes maintaining subcritical conditions.

The applicant's response clarified that the term "protection" in the definition of intended function, as noted above, includes maintenance of subcritical conditions. The staff's review confirmed that the applicant did identify structural components whose intended function is maintaining subcriticality, such as the boraflex inserts used in the Unit 1 spent fuel pool, and that the intended function was cited for these components. The staff therefore finds the applicant's response to be acceptable, because the appropriate components and their intended functions are identified in accordance with 10 CFR 54.21(a)(1).

The staff's review found that the components of the fuel handling equipment that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.2.8.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the fuel handling equipment structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.4.2.9 Intake, Discharge, and Emergency Cooling Canals

In Section 2.4.2.9 of the LRA, the applicant identifies the SCs of the intake, discharge, and emergency cooling canals which are within the scope of license renewal and subject to an AMR. The Intake, discharge and emergency cooling canals are further described in Section 2.4.9 of the Unit 1 UFSAR and Section 2.4.9 of the Unit 2 UFSAR.

2.4.2.9.1 Technical Information in the Application

The intake, discharge, and emergency cooling canals provide redundant sources of cooling water to the plant heat sink for plant shutdown. The emergency cooling canal and the intake canal in the area of the intake structure have the intended function of providing a safety-related ultimate heat sink (UHS) that is designed to withstand design basis seismic, tornado, and hurricane conditions. The discharge canal and most of the intake canal are not in the scope of license renewal because they do not perform a license renewal intended function.

The intake canal takes water directly from the Atlantic Ocean through underwater intake water pipes that run under the beach and terminate at the intake canal headwalls. In the unlikely event of blockage of the intake canal or pipes, emergency cooling water is taken from Big Mud Creek through the emergency cooling canal. The UHS dam (described in Section 2.4.2.14 of the LRA) separates the waters of Big Mud Creek from the intake canal during normal operation, and provides a safety-related source of cooling water through valved openings if the ocean intake becomes unavailable. Big Mud Creek is connected to the Atlantic Ocean through the Indian River tidal lagoon. Regardless of the source, cooling water is discharged into the discharge canal, and then flows to the Atlantic Ocean through discharge pipes.

The emergency cooling canal is seismic Category 1 in the area of the intake structure. Erosion protection in the area of the intake structure is provided by a concrete retaining wall and concrete embankments. The intake and discharge canal headwalls are reinforced concrete structures. The intake canal headwalls provide the termination point for the intake pipes from the Atlantic Ocean. The discharge canal headwalls provide the origination point for the discharge pipes to the Atlantic Ocean.

The applicant lists the following SCs of the intake, discharge, and emergency cooling canals subject to an AMR in Table 3.5-10 of the LRA: concrete erosion protection (concrete paving and grout filled fabric) and earthen canal dikes.

In Table 3.5-10 of the LRA, the applicant identifies the intended functions for SCs of the emergency cooling canal and the portion of the intake canal between the emergency cooling canal and the intake structure subject to an AMR as:

- provide a source of cooling water for plant shutdown
- provide structural support and/or shelter to components required for FP.

2.4.2.9.2 Staff Evaluation

The staff reviewed Section 2.4.2.9 of the LRA and associated license renewal boundary drawings to determine whether there is reasonable assurance that the applicant appropriately identified the SCs of the intake, discharge, and emergency cooling canals that are within the scope of license renewal in accordance with 10 CFR 54.4(a). The staff then reviewed the AMR

results provided in Table 3.5-10 of the LRA to determine whether the applicant appropriately identified the components of the intake, discharge, and emergency cooling canals that are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff sampled those components of the intake, discharge, and emergency cooling canals that were not listed in Table 3.5-10 to verify that the applicant properly identified the components that meet the above requirements. The staff also reviewed Sections 3.8.1.1.5, 3.8.1.7.5, and 9.2.7 of the Unit 1 UFSAR, and Section 9.2.5 of the Unit 2 UFSAR, and did not identify any intended functions meeting the scoping criteria in 10 CFR 54.4(a) that were omitted from Section 2.4.2.9 of the LRA.

The staff confirmed that failure of the portion of the intake and discharge canals that were not in the scope of license review would not result in loss of the UHS cooling function. Section 9.2.7 of the Unit 1 UFSAR states that the intake canal is a seismically capable structure that will remain upright during and subsequent to a design basis event. Appendix 2G of the UFSAR for Unit 1 provides an analysis of the stability of the underlying soils, and the test results provided in Supplement No. 2 to Appendix 2G verify that the intake canal sands are stable and will not liquefy in the event of an earthquake. Therefore the intake structure cannot be blocked by a flow or slide of the intake canal sands.

The discharge from the ICW system flows through two parallel trains. In addition to the direct outlet to the discharge canal, each train has an alternate standpipe outlet. In the event that the discharge canal becomes unavailable, these elevated release points provide a reliable path for the discharge flow.

The staff's review determined that the structural components of the intake, discharge, and emergency cooling canal that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.2.9.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the the intake, discharge, and emergency cooling canal structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.4.2.10 Intake Structures

In Section 2.4.2.10 of the LRA, the applicant identifies the SCs of the intake structures that are within the scope of license renewal and subject to an AMR. The intake structures are further described in Sections 2.4.8 and 3.8.1.1.4 of the Unit 1 UFSAR and Section 3.8.4.1.5 of the Unit 2 UFSAR.

2.4.2.10.1 Technical Information in the Application

The intake structures are seismic Category 1 reinforced concrete structures containing the circulating water and ICW pumps. Each intake structure consists of
a base mat, exterior walls braced internally to the bay walls, and an operating deck. Water enters each intake structure through four submerged openings and passes through the

stationary and traveling screens before entering the rear of the intake structure, where the pumps are located.

The applicant listed the structure and component types of the intake structures requiring an AMR in Table 3.5-11 of the LRA as follows: structural steel framing (columns, beams, connections, etc.), structural steel framing (columns, beams, connections, etc.), component supports (non-safety-related), safety-related pipe and component supports, non-safety-related pipe supports, non-safety-related pipe, segments between class break and seismic anchor, miscellaneous steel (i.e., missile barriers, hatch frame covers, etc.), conduits, conduit supports, electrical and instrument panels and enclosures, electrical and instrument panel and enclosure supports, tubing supports, cranes (passive components), reinforced concrete (slabs, walls, roofs), reinforced concrete (pump pedestals), retaining walls, conduits (non-metallic), intake level recorders, (pvc pipe), and weatherproofing.

The applicant also identified the following intended functions of the SCs of the intake structures:

- provide structural support to safety-related components
- provide shelter/protection to safety-related components
- provide a source of cooling water for plant shutdown
- provide missile barriers
- provide structural support to non-safety-related components whose failure could prevent satisfactory accomplishment of the intended functions of safety-related structutres or components
- provide structural support and/or shelter to components required for FP

2.4.2.10.2 Staff Evaluation

The staff reviewed Section 2.4.2.10 of the LRA and Sections 2.4.8 and 3.8.1.1.4 of the Unit 1 UFSAR, and Section 3.8.4.1.5 of the Unit 2 UFSAR to determine whether the SCs of the intake structures within the scope of license renewal and subject to an AMR have been appropriately identified in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively. The staff also focused on the SCs that were not identified as being subject to an AMR to determine whether any components were omitted.

In a meeting dated June 10, 2002, the staff requested that the applicant explain why flood protection is not required, although Section 3.8.1.1.4 of the Unit 1 UFSAR states that “The structure is designed to withstand seismic, tornado, missile and hurricane loadings and flooding.” Flood protection is not listed in Section 2.4.2.10 of the LRA as one of the attributes of the intake structures. In addition, none of the components types listed in Table 3.5-11 of the LRA is credited with the intended function of flood protection.

The applicant responded that the information requested by the staff is contained in Section 3.4.4 of the Unit 1 UFSAR. Flood protection is provided to the intake structure by locating the ICW pump motors above Elevation 22 feet. As discussed in Sections 2.4.5.6 and 2.4.5.7 of the Unit 1 UFSAR, the need for additional flood protection beyond what is provided by the elevations of the openings of the safety-related structures is not required to protect any of the safety-related structures from wave runup or wind driven rain, even during a probable maximum hurricane.

The staff finds the applicant's justification for the omission of the flood protection intended function to be acceptable, as the safety-related components in the intake structure are located above the anticipated maximum flood level.

The staff's review found that the SCs of the intake structures that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.2.10.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the intake structures structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.4.2.11 Rector Auxiliary Buildings

In Section 2.4.2.11 of the LRA, the applicant identifies the SCs of the RABs that are within the scope of license renewal and subject to an AMR. The RABs are further described in Sections 3.8.1.1.1 of the Unit 1 UFSAR and 3.8.4.1.2 of the Unit 2 UFSAR.

2.4.2.11.1 Technical Information in the Application

The RABs are seismic Category 1 reinforced concrete structures with concrete exterior walls. The interior floors are beam and girder construction supported by reinforced concrete columns. All interior walls are either solid reinforced concrete block or reinforced concrete. Equipment located in the basement is supported by reinforced concrete piers that are tied to the base mat.

The applicant listed the structures and component types of the RABs requiring an AMR in Table 3.5-12 of the LRA as follows: structural steel framing (columns, beams, connections, etc.), stairs, ladders, platforms, handrails, checkered plate, grating, galvanized component supports (non-safety-related), safety-related pipe and component supports, non-safety-related pipe supports, non-safety-related pipe segments between class break and seismic anchor, miscellaneous steel (radiation shielding, missile barriers, hatch frame covers, etc.), missile protection doors, watertight doors, airtight doors, conduits and cable trays, conduit and cable tray supports, electrical and instrument panels and enclosures, electrical and instrument panel and enclosure supports, HVAC duct supports, tubing supports, HVAC louvers, pipe whip restraints, trolleys and hoists (passive components), reinforced concrete above groundwater, reinforced concrete below groundwater (exterior), reinforced concrete below groundwater (interior), reinforced concrete masonry block walls, unreinforced concrete masonry block walls, airtight door seals, watertight door seals, and weatherproofing.

The applicant also identified the intended functions of the structure and component types of the RABs in Table 3.5-12 of the LRA as follows:

- provide pressure boundary (Halon for Unit 1 cable spreading room)
- provide structural support to safety-related components
- provide shelter/protection to safety-related components (including radiation shielding)

- provide fire barriers to retard spreading of a fire
- provide missile barriers
- provide structural support to non-safety-related components whose failure could prevent satisfactory accomplishment of the intended functions of safety-related structure and components
- provide flood protection barriers
- provide a boundary for safety-related ventilation
- provide structural support and/or shelter to components required for FP, ATWS, and/or SBO
- provide pipe whip restraint and/or jet impingement protection

2.4.2.11.2 Staff Evaluation

The staff reviewed Section 2.4.2.11 of the LRA, Section 3.8.1.1.1 of the Unit 1 UFSAR, and Section 3.8.4.1.2 of the Unit 2 UFSAR to determine whether the SCs of the RABs within the scope of license renewal and subject to an AMR have been appropriately identified in accordance with 10 CFR 54.4 and 54.21(a)(1), respectively. The staff also focused on SCs that were not identified as being subject to an AMR to determine whether any components were omitted.

In a meeting dated June 10, 2002, the staff requested that the applicant identify the table of the LRA where the stop log components are listed, or justify their omission from the scope of license renewal. Stop logs are used to protect the RAB openings against floods and high winds. Section 3.4 of the Unit 2 UFSAR describes stop logs as follows:

> These aluminum stop logs would be stacked to Elevation 22.0 feet and secured with bolts ... The stop logs are stored onsite in a manner that reserves their readiness for use. When a hurricane watch is posted for the plant, the stop logs are removed from storage and prepared for installation; with actual installation occurring when the hurricane warning is posted for the plant.

However, Table 3.5-12 of the LRA does not list the stop log components as within the scope of license renewal and subject to an AMR.

The applicant explained that the information requested by the staff is located in Section 3.4 of the Unit 2 UFSAR on page 3.4-1. Based upon the probable maximum flood high water level, wave runup level and plant island elevation, installation of flood protection stop logs at entrances whose minimum elevation is at least 19.5 feet are not deemed necessary. Additional wave runup protection is provided to the entrances of the RAB by installing stop logs to a height of 22 feet. Therefore, stop logs are considered not within the scope of license renewal. Stop logs are not used at Unit 1.

The staff finds the applicant explanation to be acceptable, on the basis that it clarifies that the stop logs are an additional precaution taken by the applicant to protect against flooding and high waves, but are not credited in the CLB for Unit 2.

The staff's review found that the SCs of the RABs that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal,

and subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.2.11.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the RABs structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.4.2.12 Steam Trestle Areas

In Section 2.4.2.12 of the LRA, the applicant identifies the SCs of the steam trestle areas that are within the scope of license renewal and subject to an AMR. The steam trestle areas are further described in Appendix 3C of the Unit 1 UFSAR and Section 3.8.4.1.9 of the UFSAR for St. Lucie Unit 2.

2.4.2.12.1 Technical Information in the Application

Each steam trestle area consists of two braced steel tower structures that contain safety-related components from the main steam, feedwater and auxiliary feedwater systems. There are two separate trestle compartments per unit, located between each unit's containment and turbine buildings.

The applicant listed the SCs of the steam trestle area requiring an AMR in Table 3.5-13 of the LRA as follows: structural steel framing (columns, beams, connections, etc.), stairs, ladders, platforms, handrails, checkered plate, non-safety-related component supports, safety-related pipe and component supports, non-safety-related pipe supports, non-safety-related pipe segments between class break and seismic anchor, miscellaneous steel (missile barriers, steel grating, etc.), conduits and cable trays, conduit and cable tray supports, electrical and instrument panels and enclosures, electrical and instrument panel and enclosure supports, tubing supports, reinforced concrete above groundwater, reinforced concrete below groundwater (exterior), and pipe whip restraints.

The applicant also identified the intended functions of the SCs of the steam trestle areas in Table 3.5-13 of the LRA as follows:

- provide structural support to safety-related components
- provide shelter/protection to safety-related components
- provide fire barriers to retard spreading of a fire
- provide missile barriers
- provide structural support to non-safety-related components whose failure could prevent satisfactory accomplishment of the intended functions of safety-related structures or components
- provide structural support and/or shelter to components required for FP and/or SBO
- provide pipe whip restraint and/or jet impingement protection

2.4.2.12.2 Staff Evaluation

The staff reviewed Section 2.4.2.12 of the LRA, Appendix 3C of the Unit 1 UFSAR and Section 3.8.4.1.9 of the Unit 2 UFSAR to determine whether the SCs of the steam trestle areas within the scope of license renewal and subject to an AMR have been adequately identified in accordance with 10 CFR 54.4(a) and 54.21(a)(1). The staff also focused on components that were not identified as being subject to an AMR to determine if any components were omitted.

In a meeting that took place on June 10, 2002, the staff discussed the steam trestle area with the applicant. The staff referred to Appendix 3C of the UFSAR for Unit 1, which states, "The only other safety-related components in the area are the three auxiliary feedwater pumps and motors which are located under the trestles." On page 3C-4 it is stated that:

> There is no danger that a rupture of a steam line or feedwater line could cause a loss of function of more than one auxiliary pump due to flooding. Each of the three pumps are provided with a flood wall around them to Elevation 22 feet.

A list of steam trestle areas structural components subject to an AMR and their intended functions is provided in Table 3.5-13 of the LRA. In that table, the component type "reinforced concrete above and below groundwater" is listed along with its intended functions. However, flood protection is not included as an intended function for that component, or for any of the components listed in Table 3.5-13. The applicant was therefore asked to justify the omission of the flood protection intended function.

As documented in the meeting summary dated July 31, 2002, the applicant responded that the information requested by the staff is contained in Unit 1 UFSAR Section 3.2.2 on pages 3.2-4 to 2.3-10. The steam trestle areas are not safety-related structures and are not designed against flooding. However, components located in the steam trestle areas are required to be positioned at sufficient elevations to preclude flooding. The staff finds the applicant's response to be acceptable, on the basis that it explains that flood prevention is provided by positioning of the components in the steam trestle area, and not by mitigative structures such as wall or curbs.

The staff's review found that the structural components of the steam trestle areas that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.2.12.3 Conclusions

Tthe staff concludes that there is reasonable assurance that the applicant has appropriately identified steam trestle areas structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.4.2.13 Turbine Buildings

In Section 2.4.2.13 of the LRA, the applicant identifies the SCs of the turbine buildings that are within the scope of license renewal and subject to an AMR. The turbine buildings are further described in Sections 3.8.4.1 of the UFSAR for Unit 1 and Section 3.8.4.1.12 of the UFSAR for Unit 2.

2.4.2.13.1 Technical Information in the Application

The turbine buildings are primarily open steel frame structures, rectangular in shape, and built on reinforced concrete mat foundations. The operating deck of each turbine building supports a gantry crane. The turbine generator units are supported on separate concrete pedestals. The operating decks and intermediate mezzanine levels are concrete slabs.

The turbine buildings are not designed to seismic Category 1 requirements. However, both turbine buildings were seismically analyzed and found to maintain their structural integrity for the seismic loading condition. The only safety-related components in the Unit 1 turbine building are two safety-related valve motors for the isolation valves on the discharge of the feedwater pumps and associated safety-related power. There are no safety-related components in the Unit 2 turbine building. Both turbine buildings have safety-related piping buried beneath the ground floor slab.

The applicant listed the structure and component types of the turbine buildings requiring an AMR in Table 3.5-14 of the LRA as follows: structural steel framing (columns, beams, connections, etc.), non-safety-related component supports, non-safety-related pipe segments between the class break and the seismic anchor, non-safety-related pipe supports (including the pipe hangers that indirectly support the Unit 1 safety-related main feedwater isolation valve motors), conduits and cable trays, conduit and cable tray supports, electrical and instrument panels and enclosures, electrical and instrument panel and enclosure supports, tubing supports, gantry cranes (passive components), turbine generator casings covers, and reinforced concrete above groundwater.

The applicant also identified the intended functions of the SCs of the turbine buildings in Table 3.5-14 of the LRA as follows:

- provide structural support to safety-related components (Unit 1 only)
- provide shelter/protection to safety-related components (Unit 1 only)
- provide structural support to non-safety-related components whose failure could prevent satisfactory accomplishment of the intended functions of safety-related structures or components
- provide missile barriers
- provide structural support and/or shelter to components required for FP, ATWS, and/or SBO

2.4.2.13.2 Staff Evaluation

The staff reviewed Section 2.4.13.1 of the LRA, Section 3.8.4.1 of the Unit 1 UFSAR and Section 3.8.4.1.12 of the Unit 2 UFSAR to determine whether there is reasonable assurance that the SCs of the turbine buildings within the scope of license renewal and subject to an AMR have been appropriately identified in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively. The staff also focused on SCs that were not identified as being subject to an AMR to determine whether any components were omitted.

In a meeting with the applicant on June 10, 2002, the staff referred to Section 2.4.2.13 of the LRA that states “Both Turbine Buildings have safety-related piping buried beneath the ground

floor slab." However, the safety-related piping buried beneath the ground floor slab is not included in Table 3.5-14 of the LRA. The staff requested that the applicant justify the omission of buried safety-related piping from Table 3.5-14.

As documented in the meeting summary dated July 31, 2002, the applicant responded that this information is contained in Table 3.4-3 for the auxiliary feedwater and condensate system on page 3.4-16 of the LRA. The component group piping/fittings for stainless steel material is exposed to buried and embedded/encased environments. Note 1 reads, "Condensate storage tank cross-connect piping is susceptible to wetting." Note 2 reads, "Unit 1 auxiliary feedwater pump suction and recirculation piping is buried in sand beneath the Turbine Building and is not susceptible to wetting. Unit 2 auxiliary feedwater pump suction and recirculation piping is embedded/encased in concrete.

The staff found the applicant's explanation to be acceptable, on the basis that it clarifies that the piping buried beneath the turbine building is subject to an AMR in accordance with 10 CFR 54.21(a)(1).

The staff's review found that the SCs of the turbine buildings that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.2.13.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the turbine buildings structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.4.2.14 Ultimate Heat Sink Dam

Section 2.4.2.14 of the LRA identifies the components of the ultimate heat sink dam structure which are within the scope of license renewal and subject to an AMR. The ultimate heat sink dam is described in Sections 3.8.1.1.5, 3.8.1.7.5, and 9.2.7 of the Unit 1 UFSAR and Section 9.2.5 of the Unit 2 UFSAR.

2.4.2.14.1 Technical Information in the Application

The ultimate heat sink (UHS) dam has the intended function of providing a safety-related secondary source of cooling water to the ultimate heat sink for Units 1 and 2. The UHS dam is a seismic category 1 reinforced concrete retaining wall that extends across the emergency cooling canal. The UHS dam separates the waters of Big Mud Creek from the intake canal during normal operation, and provides a safety-related source of cooling water through valved openings in the unlikely event that the ocean intake becomes unavailable. The primary source of UHS water is the ocean intake structure and intake canal. Big Mud Creek is connected to the Atlantic Ocean through the Indian River tidal lagoon. Water from Big Mud Creek flows through the dam in two parallel 137 cm (54 inch) pipes with pneumatically operated butterfly valves that are normally closed and spring open upon interruption of the air supply. The

mechanical components contained in the UHS dam are included in the mechanical screening described in Sections 2.3.3.5.

The main structure of the UHS dam consists of the concrete barrier wall, the perpendicular concrete buttresses, the concrete mat foundation, and the equipment rooms.

The ultimate heat sink dam is in the scope of license renewal because it:

- provides structural support to safety-related components
- provides shelter/protection to safety-related components
- provides missile barriers
- provides structural support to non-safety-related components whose failure could prevent satisfactory accomplishment of the intended functions of safety-related structures or components

Based on the intended functions previously identified, the applicant listed the following ultimate heat sink dam components subject to an AMR in Table 3.5-15: pipe, miscellaneous steel, conduit and cable trays, conduit and cable tray supports, electrical and instrument panels and enclosures, electrical and instrument panels and enclosure supports, tubing supports, steel sheet piling and reinforced concrete. In that table, the applicant identified the intended functions for ultimate heat sink dam components subject to an AMR as: shelter/protection, missile barriers, and structural support.

2.4.2.14.2 Staff Evaluation

The staff reviewed Section 2.4.2.14 of the LRA and Sections 3.8.1.1.5, 3.8.1.7.5, and 9.2.7 of the Unit 1 UFSAR, and Section 9.2.5 of the Unit 2 UFSAR to determine whether there is reasonable assurance that the structural components of the UHS dam within the scope of license renewal and subject to an AMR have been appropriately identified in accordance with 10 CFR 54.4(a) and 54.21(a)(1), respectively.

The staff's review found that the structural components of the UHS dam that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.2.14.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the UHS dam structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.4.2.15 Yard Structures

In Section 2.4.2.15 of the LRA, the applicant identifies the components of the yard structures that are within the scope of license renewal and subject to an AMR. The yard structures are further described in Sections 2.4.5.3.2 and 8.3.1.1.9 of the Unit 1 UFSAR.

2.4.2.15.1 Technical Information in the Application

Yard structures includes concrete foundations, concrete pipe trenches, concrete duct banks, electrical manholes, and the discharge canal nose wave protection. Steel support structures associated with these concrete structures are also included.

The applicant listed the SCs of the yard structures requiring an AMR in Table 3.5-16 of the LRA as follows: component supports (non-safety-related), safety-related pipe supports and component supports, safety-related pipe supports and component supports, non-safety-related pipe supports, non-safety-related pipe supports, non-safety-related pipe segments between class break and seismic anchor, conduits and cable trays, conduit and cable tray supports, electrical and instrument panels and enclosures, electrical and instrument panel and enclosure supports, tubing supports, steel missile shield for diesel oil pipe (Unit 2 only), discharge canal nose wave protection (sheet piling), foundations (fire pumps, pipe supports, city water tanks, refueling water tanks, and Unit 2 primary water tank), concrete missile shield for diesel oil pipe, discharge canal nose wave protection (concrete cap), electrical duct banks and manholes, and reinforced concrete pipe trenches.

The applicant also identified the intended functions of the yard structures in Table 3.5-16 of the LRA as follows:

- provide structural support to safety-related components
- provide shelter/protection to safety-related components
- provide missile barriers
- provide structural support to non-safety-related components whose failure could prevent satisfactory accomplishment of the intended functions of safety-related structures or components
- provide flood protection barriers
- provide structural support and/or shelter to components required for FP and/or SBO

2.4.2.15.2 Staff Evaluation

The staff reviewed Section 2.4.2.15 of the LRA, Sections 2.4.5.3.2 and 8.3.1.1.9 of the Unit 1 UFSAR to determine whether the SCs of the yard structures within the scope of license renewal and subject to an AMR have been adequately identified in accordance with 10 CFR 54.4(a) and 54.21(a)(1). The staff also focused on components that were not identified as being subject to an AMR to determine if any components were omitted.

The yard sump is highlighted on license renewal boundary drawing 2-FP-01 (at locations H4, H5). However, the yard sump is not listed in Table 3.5-16 of the LRA as being subject to an AMR. In a meeting conducted June 10-11, 2002, the staff requested that the applicant identify the yard sump in the applicable table of the LRA, or justify its exclusion from the scope of license renewal and being subject to an AMR.

As documented in the meeting summary dated July 31, 2002, the applicant responded that the information requested by the staff (and noted above) is contained in Table 3.5-16 of the LRA (page 3.5-93). The yard sump is described as a recess in the foundation slab that is identified

as a reinforced concrete pipe trench. The staff finds the applicant's response to be acceptable, as it clarifies that the yard sump is within the scope of license renewal and subject to an AMR.

The staff's review found that the SCs of the yard structures that have an intended function meeting the criteria of 10 CFR 54.4(a) have been identified as being within the scope of license renewal, and are subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff did not identify any omissions.

2.4.2.15.3 Conclusions

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the yard structures structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.5 Scoping and Screening Results: Electrical, Instrumentation, and Control (I&C) Systems

In Section 2.5, "Scoping and Screening Results - Electrical and Instrumentation and Controls (I&C) Systems," of the LRA, the applicant identifies electrical and instrumentation and control (I&C) systems and component commodity groups subject to an AMR. The staff reviewed this section of the LRA to determine that all electrical/I&C systems and component commodity groups which should be within scope of Part 54 have been identified pursuant to the requirements of 10 CFR 54.4(a) and that, from these identified systems and component commodity groups, all electrical/I&C component commodity groups which should be subject to an AMR have been identified pursuant to the requirements of 10 CFR Part 54.21(a)(1).

2.5.1 Summary of Technical Information in the Application

2.5.1.1 Plant Level Scoping Results

St. Lucie Nuclear Plant's Integrated Plant Assessment (IPA) methodology consists of scoping, screening, and AMRs. If a system, in whole or in part, meets one or more of the license renewal scoping criteria, the system is considered to be within the scope of license renewal.

2.5.1.1.1 Out of Scope Electrical, I&C, and Mechanical Systems

The following electrical/I&C systems (identified in Table 2.2-3 of the LRA) and thus their associated component commodity groups were determined to be out of scope: computer process and reactivity, generation and distribution (which includes main, auxiliary, and start-up transformers and the switchyard), loose parts monitoring, meteorological monitoring, reactor regulating, and seismic monitoring systems. The following mechanical systems (identified in Table 2.2-1 of the LRA) and thus their associated electrical/I&C component commodity groups were determined to be out of scope: air blower, blowdown cooling, blowdown waste management, cathodic protection, chemical feed, circulating water, condensate polishing, condensate recovery, containment airborne radioactivity removal (Unit 1 only), demineralized water, extraction steam, heater drains and vents, hypochlorite, meteorological monitoring, miscellaneous drains, neutralization basin, processed blowdown, security, sluice water, steam generator blowdown treatment facility – demineralization, steam generator blowdown treatment

facility - radiation monitoring, steam generator blowdown treatment facility - spent resin, turbine lube oil, water treatment plant and Ecolochem facility, and wet lay-up.

2.5.1.1.2 In-Scope Electrical, I&C, and Mechanical Systems

The following electrical systems (identified in Table 2.2-3 of the LRA) and thus their associated component commodity groups were found to be in-scope: 120/208 V electrical, 120 V Vital AC, 125 V DC, 4.16 kV electrical, 480 V electrical, 6.9 kV electrical, communications, containment electrical penetrations (which includes conductor, non-metallic, and non-pressure boundary portions), data acquisition remote terminal unit, miscellaneous (includes EQ commodities), nuclear instrumentation, reactor protection, safeguards panels, and station grounding system. The following mechanical systems (identified in Table 2.2-1 of the LRA) and thus their associated electrical component commodity groups were determined to be in scope: auxiliary feedwater and condensate, chemical and volume control, component cooling water, containment cooling, containment isolation, containment post accident monitoring, containment spray, demineralized makeup water (Unit 2 only), diesel generators and support systems, emergency cooling canal, FP, fuel pool cooling, instrument air, ICW, main feedwater and steam generator blowdown, main steam, auxiliary Steam, and turbine (includes main generator), miscellaneous bulk gas supply, primary makeup water, reactor coolant, safety injection, sampling, service water, turbine cooling water (Unit 1 only), ventilation, and waste management system.

2.5.1.2 Component Level Scoping Results

2.5.1.2.1 Out of Scope Electrical, I&C, and Mechanical Components

The following electrical/I&C component commodity groups associated with electrical, I&C, and mechanical systems (identified in Section 2.5.1 of the LRA) were determined to be out of scope for license renewal: electrical buses, transmission conductors, and high voltage insulators.

2.5.1.2.2 In-scope Electrical, I&C, and Mechanical Components

The following electrical/I&C component commodity groups associated with electrical, I&C, and mechanical systems (identified in Table 2.5-1 of the LRA) were determined to be in-scope for license renewal: alarm units (including fire detectors), circuit breakers, fuses, signal conditioners, analyzers, generators, motors, solenoid operators, annunciators, communication equipment, solid-state devices, batteries, high voltage surge arrestors, indicators, switches, isolators, light bulbs, cables/connections (including insulated cables and connections, uninsulated ground conductors, splices, and terminal blocks), bus, electrical portions of electrical/I&C penetration assemblies, electric heaters, heat tracing, loop controllers, internal component assemblies for switchgears, load centers, motor control centers, and distribution panels, meters, power supplies, transformers, electrical/I&C controls and panel internal component assemblies, radiation monitors, recorders, regulators, chargers, converters, inverters, elements, resistance temperature detectors (RTDs), sensors, thermocouples, transducers, relays, and transmitters.

2.5.1.3 Component Level Screening and Scoping Results

The following component commodity groups of the systems found to be in-scope were identified as being subject to an aging management program: cables and connections (including insulated cables and connections, uninsulated ground conductors, splices, and terminal blocks) not included in the 10 CFR 50.49 Environmental Qualification Program.

2.5.2 Staff Evaluation

2.5.2.1 Scoping - 10 CFR 54.4(a)

2.5.2.1.1 Offsite System

Section 2.5.1 of the LRA indicates that the generation and distribution system (which includes electrical bus, transmission conductor, and high-voltage insulator component commodity groups) do not meet any of the scoping criteria of 10 CFR 54.4(a). The staff disagreed with this conclusion. 10 CFR 54.4(a)(3) requires that all systems, structures, and components relied on (in safety analyses or plant evaluations) to perform a function that demonstrates compliance with the Commissions regulations for station blackout (10 CFR 50.63) be included within the scope of license renewal. 10 CFR 50.63 requires that each light-water-cooled power plant licensed to operate be able to withstand and recover from a station blackout of a specified duration. The establishment of this specified duration (or coping) can be based on plant evaluations that follow the guidance in NRC Regulatory Guide 1.155 and NUMARC 87-00. This guidance requires that the plant evaluation consider offsite system characteristics such as the expected frequency of loss of offsite power and the probable time needed to recover offsite power. Offsite systems (i.e., the generation and distribution system at St. Lucie) can be relied on in plant evaluations to perform a function that demonstrates compliance with the Commission regulations for station blackout (10 CFR 50.63). Thus, pursuant to 10 CFR 54.4(a)(3), offsite systems (the generation and distribution system) are required to be included within the scope of license renewal.

The staff pursued offsite system scoping generically and held several public meetings on the subject. From this generic pursuit, the staff by letter dated April 1, 2002, issued the following NRC staff position on the license renewal rule (10 CFR 54.4) as it relates to the station blackout rule (10 CFR 50.63):

> Staff Position
>
> Consistent with the requirements specified in 10 CFR 54.4(a)(3) and 10 CFR 50.63(a)(1), the plant system portion of the offsite power system should be included within the scope of license renewal. The reasons for support of this position follow:
>
> Rationale
>
> The license renewal rule, 10 CFR 54.4(a)(3), requires that, "All systems, structures, and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for.....station blackout (10 CFR 50.63)" be included within the scope of license renewal. The station blackout (SBO) rule, 10 CFR 50.63(a)(1), requires that each light-water-cooled nuclear power plant licensed to operate be able to withstand and recover from a station blackout of a specified duration that is based upon factors that include: "(iii) The expected frequency of loss of offsite power; and (iv) The probable time needed to restore offsite power." The SBO rule in this regard is consistent with the staff findings identified in the statement of considerations and NUREG-1032, "Evaluation of Station Blackout Accidents at Nuclear Power Plants." In particular, with regard to factor (iv), the staff found that

offsite power is more likely to be restored (0.6 hours median time to restore) than the emergency diesel generators (8 hours median time to repair) in terminating an SBO event.

Station Blackout is the loss of offsite and onsite AC electric power to the essential and non-essential switchgear buses in a nuclear power plant. It does not include the loss of AC power fed from inverters powered by station batteries nor loss of AC power from an SBO defined alternate AC power source. The SBO rule was added to the regulations in 10 CFR Part 50 because, as operating experience accumulated, concern arose that the reliability of both the offsite and onsite AC power systems might be less than originally anticipated, even for designs that met the requirements of General Design Criteria 17 and 18. As a result, the SBO rule required that nuclear power plants have the capability to withstand and recover from the loss of offsite and onsite AC power of a specified duration (the coping duration).

Licensees' plant evaluations followed the guidance specified in NRC Regulatory Guide (RG) 1.155 and NUMARC 87-00 to determine their required plant-specific coping duration. The criteria specified in RG 1.155 to calculate a plant-specific coping duration were based upon the expected frequency of loss of offsite power and the probable time needed to restore offsite power, as well as the other two factors (onsite emergency AC power source redundancy and reliability) specified in 10 CFR 50.63(a)(1). In requiring that a plant's coping duration be based in part on the probable time needed to restore offsite power, 10 CFR 50.63(a)(1) is specifying that the offsite power system be an assumed method of recovering from an SBO. Disregarding the offsite power system as a means of recovering from an SBO would not meet the requirements of the rule and would result in a longer required coping duration.

The use of the offsite power system within 10 CFR 50.63(a)(1) as a means of recovering from an SBO should not be construed to be the only acceptable means of recovering from an SBO. A licensee could for example recover offsite power or emergency (onsite) power. It is not possible to determine prior to an actual SBO event which source of power can be returned first. As a result, 10 CFR 50.63(c)(1)(ii) and its associated guidance in RG 1.155, Section 1.3 and Section 2, requires procedures to recover from an SBO that include restoration of offsite and onsite power.

Based on the above, both the offsite and onsite power systems are relied upon to meet the requirements of the SBO rule. Elements of both offsite and onsite power are necessary to determine the required coping duration under 10 CFR 50.63(a)(1), and the procedures required by 10 CFR 50.63(c)(1)(ii) must address both offsite power and onsite power restoration. It follows, therefore, that both systems are used to demonstrate compliance with the SBO rule and must be included within the scope of license renewal consistent with the requirements of 10 CFR 54.4(a)(3). License renewal applicants are presently including the onsite power system within the scope of license renewal on the basis of the requirements under 10 CFR 54.4(a)(1) (safety-related systems). They are also including equipment that is relied upon to cope with an SBO (e.g., alternate AC power sources) on the basis of the requirements under 10 CFR 54.4(a)(3). Only the addition of the offsite power system is therefore necessary to complete the required scope of the electrical power systems under license renewal.

The offsite power systems of U.S. nuclear power plants consist of a transmission system (grid) component that provides a source of power and a plant system component that connects that power source to a plant's onsite electrical distribution system which powers safety equipment. The staff has historically relied upon the well-distributed, redundant, and interconnected nature of the grid to provide the necessary level of reliability to support nuclear power plant operations. For purposes of the license renewal rule, the staff has determined that the plant system portion of the offsite power system that is used to connect the plant to the offsite power source should be included within the scope of the rule. This path typically includes the switchyard circuit breakers that connect to the offsite system power transformers (startup transformers), the transformers themselves, the intervening overhead or underground circuits between circuit breaker and transformer and transformer and onsite electrical distribution system, and the associated control circuits and structures. Ensuring that the appropriate offsite power system long-lived passive SCs that are part of this circuit path are subject to an AMR will assure that the bases underlying the SBO requirements are maintained over the period of the extended license. This is consistent with the Commission's expectations in including the SBO regulated event under 10 CFR 54.4(a)(3) of the license renewal rule.

By NRC letter dated July 1, 2002, the staff requested the applicant to (a) describe (consistent with the above defined staff position) the process used to evaluate the SBO portion of the criterion defined in 10 CFR 54.4(a)(3) and (b) provide a list of those additional component commodity groups identified to be within scope as a result of this evaluation. By letter dated September 26, 2002, the applicant identified the following electrical component commodity groups included in the scope of license renewal as meeting the scoping criteria of 10 CFR 54.4(a)(3) for restoration of offsite power: circuit breakers and switches to connect the startup transformer circuits to the grid, batteries and DC controls associated with the startup transformer circuit breakers, startup transformers, non-safety-related 4.16 kV switchgear, DC control and power (lead sheath) cables, all aluminum alloy conductor (Type AAAC) transmission conductors between the startup transformers and circuit breakers, high voltage insulators associated with the transmission conductors, switchyard bus and connections between the startup transformers and circuit breakers, nonsegregated-phase bus between the startup transformers and the non safety-related 4.16 kV switchgear.

2.5.2.1.2 Fuse Holders

Per discussion with the NRC during the public meetings on September 4 and 5, 2002, the applicant was requested to address the NRC May 16, 2002, letter entitled, "Proposed Staff Guidance on the Identification and Treatment of Electrical Fuse Holders for License Renewal." The applicant by letter dated October 3, 2002 in response to RAI 2.5-1 indicated that they agree with the NRC position that fuse holders are within the scope of license renewal.

2.5.2.2 Passive Screening - 10 CFR 54.21(a)(1)(i)

From the electrical/I&C component commodity groups identified in Table 2.5-1 of the LRA, the following were determined to meet the screening criterion of 10 CFR 54.21(a)(1)(i): cables and connections (including insulated cables and connections, uninsulated ground conductors, splices, and terminal blocks); and electrical/I&C penetration assemblies (electrical portions). In addition, by letter dated October 3, 2002, in response to RAI 2.5-1, the applicant indicated that fuse holders/blocks are classified as a specialized type of terminal block because of the similarity in design and construction and that fuse holders within the scope of license renewal that are not included as a piece part of a larger active commodity group, such as switchgear were determined to meet passive screening criterion of 10 CFR 54.21(a)(1)(i).

In addition, the following passive electrical/I&C component commodity groups identified in Section 2.5.1 of the LRA were initially determined to be out of scope for license renewal based on plant level scoping results: electrical buses, transmission conductors, and high voltage insulators. Subsequently, these commodity groups (based on the applicants September 26, 2002 response to the staff's SBO position, described above) were identified to be within the scope of license renewal and were also identified to meet passive screening criterion of 10 CFR 54.21(a)(1)(i).

Passive component commodity groups (for which aging degradation is not readily monitored) are those that perform an intended function without moving parts or without a change in configuration or properties. As examples of passive component commodity groups, 10 CFR 54.21(a)(1)(i) conveys that electrical component commodity groups meeting this passive definition as including, but not limited to, electrical penetrations, cables, and

connections, and as excluding, but not limited to, motors, diesel generators, pressure transmitters, pressure indicators, water level indicators, switchgears, cooling fans, transistors, batteries, breakers, relays, switches, power inverters, circuit boards, battery chargers, and power supplies.

The staff reviewed the above identified component commodity groups to verify that the applicant did not omit any passive component commodity groups and that they meet the above defined passive screening criteria and/or examples conveyed by 10 CFR 54.21(a)(1)(i). The staff concluded that the above identified component commodity groups are consistent with the examples of passive component commodity groups conveyed by 10 CFR 54.21(a)(1)(i) and are therefore considered acceptable. In addition, these component commodity groups were found to be the same as the passive determinations described in NEI-95-10 (Revision 3), Appendix B, for component commodity groups in the electrical category. The staff has reviewed these NEI determinations and concluded: (1) that each component commodity group identified performs its intended function without moving parts or without a change in configuration or properties and its aging degradation is not readily monitored and (2) that these component commodity groups acceptably identify passive component commodity groups pursuant to 10 CFR 54.21(a)(1)(i). Therefore, the staff agrees that the above identified subgroup of electrical/I&C component commodity groups within the scope of license renewal represents the passive electrical/I&C component commodity groups that would be required to be included in an AMR if they also meet long-lived screening criteria.

2.5.2.3 Long-lived screening - 10 CFR 54.21(a)(1)(ii)

From the subgroup electrical/I&C component commodity groups identified to be within scope and as passive, the applicant eliminated component commodity groups that are required to meet 10 CFR 50.49 and thus identified the following component commodity groups as meeting the long-lived screening criterion of 10 CFR 54.21(a)(1)(ii) and subject to an AMR: cables and connections (including insulated cables and connections, uninsulated ground conductors, splices, and terminal blocks) not included in the St. Lucie 10 CFR 50.49 EQ Program. In addition, by letter dated October 3, 2002, in response to RAI 2.5-1, the applicant indicated that fuse holders/blocks are classified as a specialized type of terminal block that likewise meet the long-lived screening criterion of 10 CFR 54.21(a)(1)(ii) and are subject to an AMR.

In addition, the following passive electrical/I&C commodity groups identified in Section 2.5.1 of the LRA were initially determined to be out of scope for license renewal based on plant level scoping results: electrical buses, transmission conductors, and high voltage insulators. Subsequently, these component commodity groups (based on the applicants September 26, 2002, response to the staff's SBO position, described above) were identified to be within the scope of license renewal, were identified to meet passive screening criterion 10 CFR 54.21(a)(1)(i), and were also identified to meet long lived screening criterion of 10 CFR 54.21(a)(1)(ii) and subject to an AMR.

A component that is not replaced either (i) on a specified interval based upon the qualified life of the component or (ii) periodically in accordance with a specified time period, is deemed to be "long-lived," and therefore subject to an AMR. Components subject to EQ aging requirements pursuant to 10 CFR 50.49(e)(5) are required to be replaced or refurbished at the end of their designated life. These components, pursuant to 10 CFR 50.49(e)(5), are subject to

replacement based on a qualified life or on a specified time period. The applicant in the LRA conveyed that the above identified component commodity groups are included in their 10 CFR 50.49 EQ program and subject to aging requirements of 10 CFR 50.49(e)(5). The staff, therefore, agrees that the above identified component commodity groups meet long-lived screening criteria and are thus subject to an AMR.

Based on the above review, the staff did not find any omissions.

2.5.3 Conclusion

The staff concludes that there is reasonable assurance that the applicant has appropriately identified the electrical and instrumentation and controls system components subject to the AMR in accordance with the requirements state in 10 CFR 54.21(a)(1).