FPL

L-2000-177
10 CFR 54
10 CFR 51
10 CFR 2
10 CFR 50

SEP 0 8 2000

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Application for Renewed Operating Licenses

Pursuant to U.S. Nuclear Regulatory Commission (NRC) regulations set forth in 10 CFR 50, 51 and 54, Florida Power and Light Company (FPL) hereby applies for the renewal of the operating licenses for Turkey Point Units 3 and 4, issued under Section 104 of the Atomic Energy Act of 1954, as amended. FPL requests that the facility operating licenses for Turkey Point Unit 3 (DPR-31) and Turkey Point Unit 4 (DPR-41) be extended for twenty (20) years beyond their current expiration dates. For Turkey Point Unit 3 (DPR-31), license renewal would extend the operating license from midnight July 19, 2012, until midnight July 19, 2032. For Turkey Point Unit 4 (DPR-41), license renewal would extend the operating license from midnight April 10, 2013, until midnight April 10, 2033.

FPL submits the enclosed Turkey Point Units 3 and 4 Application for Renewed Operating Licenses (Application) in accordance with the applicable NRC operating license renewal requirements of 10 CFR 54 and 51. The Application includes an environmental report entitled, "Applicant's Environmental Report - Operating License Renewal Stage," prepared pursuant to 10 CFR 54.23 and the requirements contained in Subpart A of 10 CFR Part 51.

As required by 10 CFR 2.101(a), 50.4(b)(3), 50.30(a)(6), and 51.55(a), FPL hereby transmits the signed hardcopy original of the Application (including the Applicant's Environmental Report - Operating License Renewal Stage) and thirteen (13) copies to the NRC Document Control Desk, and one (1) copy of the same to the NRC Regional Administrator. One (1) courtesy copy of the Application is also provided to the NRC Senior Resident Inspector for Turkey Point. Twenty-six (26) additional copies of the Applicant's Environmental Report - Operating License Renewal Stage are being provided to the NRC Document Control Desk, for a total of 41 copies of the environmental report, pursuant to 10 CFR 51.55(a).

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By FPL Letter L-2000-176 to the NRC, ten (10) copies of the license renewal boundary drawings for mechanical systems (not considered part of the application) were transmitted to the NRC Document Control Desk to aid in the NRC staff review of the Application. One (1) copy of the same license renewal boundary drawings was also transmitted to both the NRC Regional Administrator and the NRC Senior Resident Inspector for Turkey Point.

FPL believes that the Application provides the appropriate administrative, technical, and environmental information sufficient to support the Commission findings required by 10 CFR 54.29. As required by 10 CFR 54, actions have been identified to manage the effects of aging on the structures and components subject to aging management review, such that their intended functions will be maintained consistent with the current licensing basis during Turkey Point's renewed term of operation.

As required by 10 CFR 54.21(b), current licensing basis changes which have a material effect on the content of this application will be identified in an amendment to the Application that will be submitted annually while the Application is under NRC review and at least three months prior to the scheduled completion of the NRC review.

The Turkey Point Units 3 and 4 Application for Renewed Operating Licenses is organized in accordance with the USNRC Draft Standard Format For License Renewal Application, C.I. Grimes (NRC) letter to D.J. Walters (NEI) dated August 9, 1999, and is consistent with the guidance provided by NEI 95-10, "Industry Guidelines for Implementing the Requirements of 10 CFR 54 - License Renewal Rule," Revision 1. The Application contains the administrative, technical, and environmental information required by the applicable regulations in 10 CFR 54 and 51. This information is presented in an efficient manner that is designed to facilitate the NRC review necessary to make the findings required by 10 CFR 54.29. This information is summarily described in the Preface to the Application and in Section 1.0 of the environmental report.

Upon receiving NRC notification that the Application is complete and acceptable for docketing, FPL will file the appropriate copies required by 10 CFR 2.101(a)(3), 50.4(b)(2), 50.30(a), and 51.55(a), and all additional copies in accordance with the above regulatory requirements and the written instructions furnished with the acceptance for docketing notice by the NRC. The filing of the Application for docketing is planned as stated in FPL Letter L-2000-169 to NRC, dated August 8, 2000.

FPL stands ready to provide assistance and information to the NRC staff to facilitate a thorough, yet efficient, review of this Application to achieve the goal of timely issuance of the requested renewed operating licenses.

Very truly yours,

T. F. Plunkett
President - Nuclear Division

TFP/EAT/rsc

Enclosure (Application)

cc: U.S. Nuclear Regulatory Commission, Washington, D.C.

Chief, License Renewal and Standardization Branch
Project Manager - Turkey Point License Renewal
Project Manager - Turkey Point

USNRC Document Control Desk
(w/13 copies of Application including Applicant's Environmental Report - Operating License Renewal Stage)
(w/26 copies of Applicant's Environmental Report - Operating License Renewal Stage)

U.S. Nuclear Regulatory Commission, Region II

Regional Administrator, Region II, USNRC
(w/one copy of Application including Applicant's Environmental Report - Operating License Renewal Stage)

Senior Resident Inspector, USNRC, Turkey Point Plant
(w/one copy of Application including Applicant's Environmental Report - Operating License Renewal Stage)

Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Application for Renewed Operating Licenses

STATE OF FLORIDA)
) ss.
COUNTY OF PALM BEACH)

T. F. Plunkett being first duly sworn, deposes and says:

That he is President - Nuclear Division of Florida Power and Light Company, the Licensee herein;

That he has executed the foregoing document; that the statements made in this document are true and correct to the best of his knowledge, information and belief, and that he is authorized to execute the document on behalf of said Licensee.

T F Plunkett
T. F. Plunkett

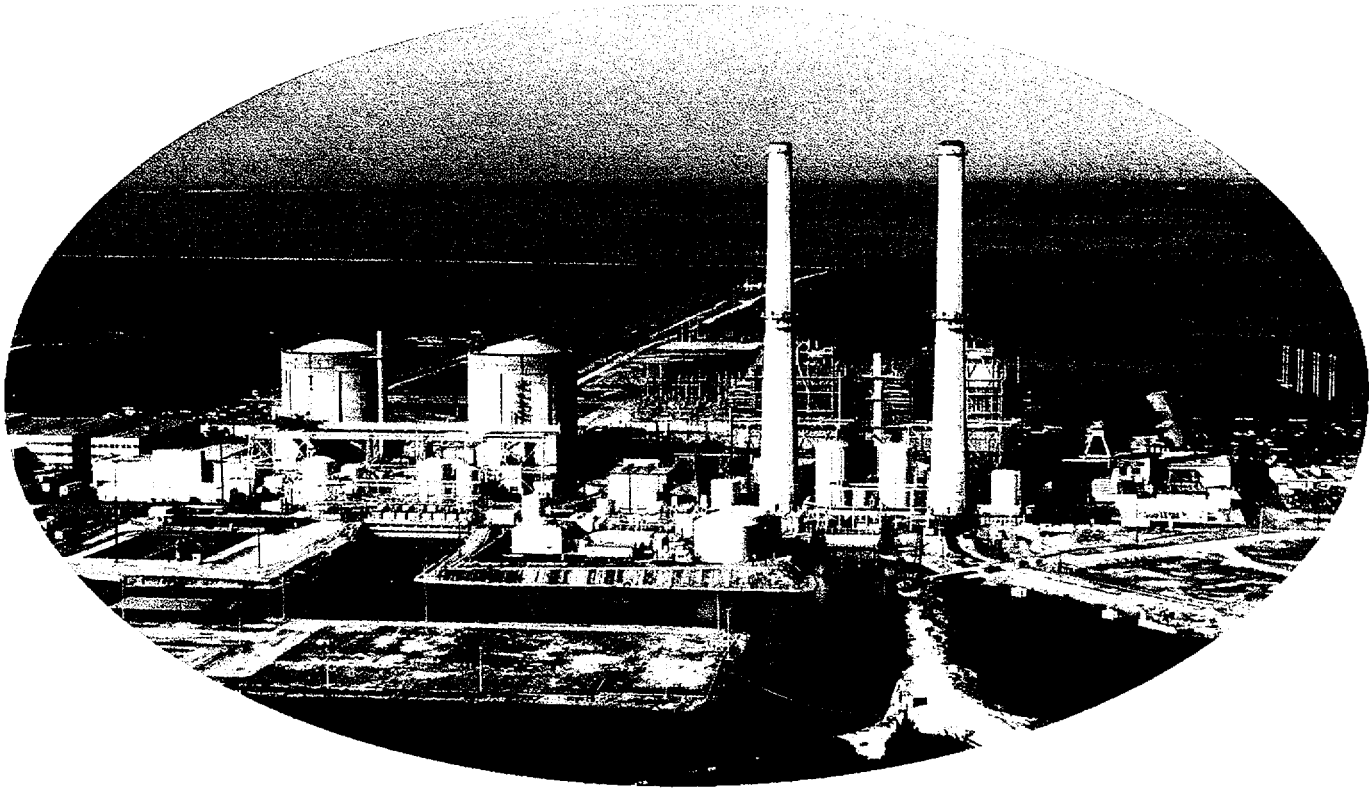
Subscribed and sworn to before me this
8th day of September, 2000.
Roberta J Economy
Roberta S. Economy
Name of Notary Public (Type or Print)

Roberta S. Economy
MY COMMISSION # CC633464 EXPIRES
June 1, 2001
BONDED THRU TROY FAIN INSURANCE, INC.

T. F. Plunkett is personally known to me.

FPL

APPLICATION FOR RENEWED OPERATING LICENSES



TURKEY POINT UNITS 3 & 4

PREFACE

The following discussion describes the content of the Turkey Point Units 3 and 4 License Renewal Application.

Chapter 1 provides the administrative information required by Part 54 of Title 10 of the Code of Federal Regulations; Sections 17 and 19 (10 CFR 54.17 and 10 CFR 54.19).

Chapter 2 provides the scoping and screening methodology. Chapter 2 describes and justifies the methodology used to determine the systems, structures, and components within the scope of license renewal and the structures and components subject to an aging management review. Tables 2.2-1, 2.2-2, and 2.2-3 provide a listing of the plant mechanical systems, structures, and electrical/I&C systems respectively, and these tables identify those plant systems and structures that are within the scope of license renewal. Chapter 2 provides a description of systems, intended functions, and references to system boundary drawings. Tables 2.3-1, 2.3-4, 2.3-5, and 2.3-6 show the drawing numbers for the mechanical systems in the scope of license renewal. The drawings are provided in a separate submittal. Tables in Chapter 3 are referenced in Chapter 2.

Chapter 3 describes the results of the aging management reviews of the components and structures requiring aging management reviews. Furthermore, Chapter 3:

- identifies the components and structures subject to aging management review and their intended functions,
- describes or references the processes used to identify aging effects requiring management (Appendix C summarizes the process used to identify aging effects associated with non-Class 1 components, which encompasses engineered safety features system components, auxiliary system components, steam and power conversion system components, and steel in fluid structural components),
- discusses the materials and environments which produce aging effects,
- identifies the aging effects requiring management,
- describes industry and plant-specific operating experiences with respect to the applicable aging effects, and
- identifies the aging management programs that will manage the aging effects requiring management.

The aging management programs and the information necessary to demonstrate that the aging effects requiring management will be adequately managed are described in Appendix B. The tables in Chapter 3 provide a comprehensive summary of information concerning the aging effects requiring management for component and commodity groupings in the scope of license renewal. For the component and commodity groupings that make up the system or structure, the tables list intended function, material, environment, aging effects, and the aging management programs and activities.

Chapter 4 includes a list of time-limited aging analyses, as defined by 10 CFR 54.3. It includes the identification of the component or subject, and an explanation of the time-dependent aspects of the calculation or analysis. Chapter 4 demonstrates that the analyses remain valid for the period of extended operation, the analyses have been projected to the end of the period of extended operation, or the effects of aging on the intended function(s) will be adequately managed for the period of extended operation. Chapter 4 also states that no 10 CFR 50.12 exemption involving a time-limited aging analysis as defined in 10 CFR 54.3 is required during the period of extended operation.

Appendix A, Updated Final Safety Analysis Report Supplement, provides a summary description of the programs for managing the effects of aging for the period of extended operation. A summary description of the evaluation of time-limited aging analyses for the period of extended operation is also included.

Appendix B, Aging Management Programs, describes the aging management programs and activities and demonstrates that the aging effects on the components and structures within the scope of the License Renewal Rule will be managed such that they will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation. The Turkey Point Units 3 and 4 programs and activities that are credited for managing aging are divided into new actions and existing actions.

Appendix C, Process for Identifying Aging Effects Requiring Management for Non-Class 1 Components, summarizes the process through which the applicable aging effects were identified and associated with the non-Class 1 components determined to be subject to an aging management review.

Appendix D, Technical Specification Changes, concludes that no technical specification changes are necessary to manage the effects of aging during the period of extended operation.

The information in Chapter 2, Chapter 3, and Appendix B fulfills the requirements in 10 CFR 54.21(a). Section 1.4 discusses how the requirements of 10 CFR 54.21(b) will be met.

The information in Chapter 4 fulfills the requirements in 10 CFR 54.21(c). The information in Appendix A and Appendix D fulfills the requirements in 10 CFR 54.21(d) and 10 CFR 54.22, respectively. The supplement to the Environmental Report, as required by 10 CFR 54.23, is provided with the Turkey Point Units 3 and 4 License Renewal Application as a separate document.

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1.1.2 ADDRESS OF APPLICANT

Florida Power & Light Company
700 Universe Boulevard
Post Office Box 14000
Juno Beach, Florida 33408-0420

Address of the Turkey Point Nuclear Plant:

Florida Power & Light Company
Turkey Point Nuclear Plant
9760 SW 344th Street
Florida City, Florida 33035-1800

1.1.3 OCCUPATION OF APPLICANT

Florida Power & Light Company (FPL) is an investor-owned utility, primarily engaged in the generation, transmission, and distribution of electricity. The service territory covers the southern third and almost the entire eastern seaboard of the State of Florida. FPL supplies electric service to more than 3.7 million residential, commercial, and industrial customers. To service this area, FPL operates 14 electric generating facilities with an installed capacity of over 16,000 megawatts (MW) electric, including the Turkey Point Nuclear Plant.

1.1.4 ORGANIZATION AND MANAGEMENT OF APPLICANT

FPL is a public utility incorporated under the laws of the State of Florida, with its principal office located in Juno Beach, Florida.

FPL is not owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government. FPL makes this application on its own behalf and is not acting as an agent or representative of any other person.

The names and business addresses of FPL's directors and principal officers are listed below. All persons listed are U.S. citizens.

Florida Power & Light Company - Directors

JAMES L. BROADHEAD
Chairman and Chief Executive Officer
Florida Power & Light Company
700 Universe Boulevard
Post Office Box 14000
Juno Beach, Florida 33408-0420

PAUL J. EVANSON
President
Florida Power & Light Company
700 Universe Boulevard
Post Office Box 14000
Juno Beach, Florida 33408-0420

DENNIS P. COYLE
General Counsel and Secretary
Florida Power & Light Company
700 Universe Boulevard
Post Office Box 14000
Juno Beach, Florida 33408-0420

LAWRENCE J. KELLEHER
Senior Vice President - Human Resources and Corporate Services
Florida Power & Light Company
700 Universe Boulevard
Post Office Box 14000
Juno Beach, Florida 33408-0420

ARMANDO J. OLIVERA
Senior Vice President - Power Systems
Florida Power & Light Company
9250 West Flagler Street
Post Office Box 029100
Miami, Florida 33102-9100

Florida Power & Light Company – Directors (continued)

THOMAS F. PLUNKETT
President - Nuclear Division
Florida Power & Light Company
700 Universe Boulevard
Post Office Box 14000
Juno Beach, Florida 33408-0420

ANTONIO RODRIGUEZ
Senior Vice President - Power Generation
Florida Power & Light Company
700 Universe Boulevard
Post Office Box 14000
Juno Beach, Florida 33408-0420

Florida Power & Light Company - Principal Officers

JAMES L. BROADHEAD
Chairman and Chief Executive Officer
Florida Power & Light Company
700 Universe Boulevard
Post Office Box 14000
Juno Beach, Florida 33408-0420

PAUL J. EVANSON
President
Florida Power & Light Company
700 Universe Boulevard
Post Office Box 14000
Juno Beach, Florida 33408-0420

DENNIS P. COYLE
General Counsel and Secretary
Florida Power & Light Company
700 Universe Boulevard
Post Office Box 14000
Juno Beach, Florida 33408-0420

Florida Power & Light Company - Principal Officers (continued)

LAWRENCE J. KELLEHER
Senior Vice President - Human Resources and Senior Corporate Services
Florida Power & Light Company
700 Universe Boulevard
Post Office Box 14000
Juno Beach, Florida 33408-0420

ARMANDO J. OLIVERA
Senior Vice President - Power Systems
Florida Power & Light Company
9250 West Flagler Street
Post Office Box 029100
Miami, Florida 33102-9100

THOMAS F. PLUNKETT
President - Nuclear Division
Florida Power & Light Company
700 Universe Boulevard
Post Office Box 14000
Juno Beach, Florida 33408-0420

ANTONIO RODRIGUEZ
Senior Vice President - Power Generation
Florida Power & Light Company
700 Universe Boulevard
Post Office Box 14000
Juno Beach, Florida 33408-0420

ROBERT L. McGRATH
Treasurer
Florida Power & Light Company
700 Universe Boulevard
Post Office Box 14000
Juno Beach, Florida 33408-0420

1.1.5 CLASS AND PERIOD OF LICENSE SOUGHT

FPL requests renewal of the Class 104b operating licenses for Turkey Point Units 3 and 4 (license numbers DPR-31 and DPR-41, respectively) for a period of 20 years beyond the expiration of the current licenses. For Turkey Point Unit 3 (DPR-31), license renewal would extend the operating license from midnight July 19, 2012, until midnight July 19, 2032. For Turkey Point Unit 4 (DPR-41), license renewal would extend the operating license from midnight April 10, 2013, until midnight April 10, 2033. This application includes a request for renewal of those NRC source material, special nuclear material, and byproduct material licenses that are currently subsumed into or combined with the current operating licenses.

The facility will continue to be known as the Turkey Point Nuclear Plant and will continue to generate electric power during the renewal period.

1.1.6 ALTERATION SCHEDULE

FPL does not propose to construct or alter any production or utilization facility in connection with this renewal application.

1.1.7 CONFORMING CHANGES TO THE STANDARD INDEMNITY AGREEMENT

The requirements at 10 CFR 54.19(b) state that license renewal applications include, "...conforming changes to the standard indemnity agreement, 10 CFR 140.92, Appendix B, to account for the expiration term of the proposed renewed license." The current indemnity agreement for Turkey Point Units 3 and 4 states, in Article VII, that the agreement shall terminate at the time of expiration of that license specified in Item 3 of the Attachment to the agreement, which is the last to expire. Item 3 of the Attachment to the indemnity agreement, as revised by Amendment No. 5, lists four license numbers. Should the license numbers be changed upon issuance of the renewed licenses, FPL requests that conforming changes be made to Item 3 of the Attachment, and any other sections of the indemnity agreement as appropriate.

1.1.8 RESTRICTED DATA AGREEMENT

This application does not contain any Restricted Data or National Security Information, and FPL does not expect that any activity under the renewed licenses for Turkey Point Units 3 and 4 will involve such information. However, if such information were to become involved, FPL agrees that it would appropriately safeguard such information and would not permit any individual to have access to, or any facility to possess, such information until the individual or facility had been approved under the provisions of 10 CFR 25 or 10 CFR 95, respectively.

1.2 DESCRIPTION OF TURKEY POINT NUCLEAR PLANT

The two nuclear power units designated as Turkey Point Units 3 and 4 are located adjacent to oil- and gas-fired Units 1 and 2 at the Turkey Point Plant. This is a steam electric generating facility situated on the shore of Biscayne Bay, about 25 miles south of Miami, Florida.

The Turkey Point Units 3 and 4 reactors are Westinghouse designed, pressurized light-water moderated and cooled systems. Each is designed to produce a core thermal power output of 2300 MWt. Each steam and power conversion system, including its turbine generator, is designed to permit generation of a net electrical output of approximately 693 MW. The units were uprated in 1996 from an initial core thermal output of 2200 MWt.

Descriptions of Turkey Point Units 3 and 4 systems and structures can be found in the Updated Final Safety Analysis Report (UFSAR). Additional descriptive information about Turkey Point Units 3 and 4 systems, structures, and components is provided in Chapters 2, 3, and 4 of this Application, and references to the UFSAR are provided where pertinent.

1.3 TECHNICAL INFORMATION REQUIRED FOR AN APPLICATION

In accordance with 10 CFR 54.21, four technical items are required to support an application for a renewed operating license. These are an integrated plant assessment (Chapters 2 and 3), an evaluation of time-limited aging analyses (Chapter 4), a supplement to the Turkey Point Units 3 and 4 UFSAR that contains a summary description of the programs and activities for managing the effects of aging and the evaluation of the time-limited aging analyses (Appendix A), and current licensing basis changes during NRC review (Section 1.4).

In addition to the technical information, 10 CFR 54.22 requires applicants to submit any technical specification changes or additions necessary to manage the effects of aging during the period of extended operation (Appendix D). Also, 10 CFR 54.23 requires the Application to include a supplement to the Environmental Report (Applicant's Environmental Report – Operating License Renewal Stage).

The Integrated Plant Assessment (IPA), as defined by 10 CFR 54.3, is a licensee assessment that demonstrates that a nuclear power plant facility's structures and components requiring aging management review in accordance with 10 CFR 54.21(a) for license renewal have been identified. The IPA also demonstrates that the effects of aging on the functionality of such structures and components will be managed to maintain the current licensing basis during the period of extended operation. The Turkey Point Units 3 and 4 IPA includes:

- identification of the structures and components within the scope of license renewal that are subject to an aging management review;
- identification of the aging effects applicable to these structures and components;
- identification of plant-specific programs and activities that will manage these identified aging effects; and
- a demonstration that these programs and activities will be effective in managing the effects of aging during the period of extended operation.

The Turkey Point Units 3 and 4 IPA for license renewal, along with other information necessary to document compliance with 10 CFR 54, is maintained in an auditable and retrievable form in accordance with 10 CFR 54.37(a). The Turkey Point Units 3

and 4 IPA is documented with site-specific reports and calculations that were generated in accordance with FPL's Quality Assurance Program. Also, note that references to the Turkey Point Units 3 and 4 Technical Specifications and the UFSAR are as of Amendments 205/199 and Amendment 16, respectively.

1.4 CURRENT LICENSING BASIS CHANGES DURING NRC REVIEW

Each year, following the submittal of the Turkey Point Units 3 and 4 License Renewal Application and at least three months before the scheduled completion of the NRC review, Turkey Point will submit amendments to the Application pursuant to 10 CFR 54.21(b). These revisions will identify any changes to the current licensing basis that materially affect the contents of the License Renewal Application, including the UFSAR supplement and any other aspects of the Application.

2.0 STRUCTURES AND COMPONENTS SUBJECT TO AN AGING MANAGEMENT REVIEW

This chapter describes the process for the identification of structures and components subject to an aging management review in the Turkey Point integrated plant assessment (IPA). For those systems, structures, and components (SSCs) within the scope of license renewal, 10 CFR 54.21(a)(1) requires a license renewal applicant to identify and list the structures and components subject to an aging management review. Furthermore, 10 CFR 54.21(a)(2) requires that the methods used to identify and list these structures and components be described and justified. The technical information in this chapter serves to satisfy these requirements.

Turkey Point's IPA methodology follows the approach recommended in NEI 95-10 [Reference 2.1-1]. The methodology consists of scoping, screening, and aging management reviews. The methodology is implemented in accordance with FPL's Quality Assurance Program.

Scoping and screening methodology is described in Section 2.1. The results of the assessment to identify the systems and structures within the scope of license renewal (plant level scoping) are contained in Section 2.2. The results of the identification of the components and structural components subject to an aging management review (screening) are contained in Section 2.3 for mechanical systems, Section 2.4 for structures, and Section 2.5 for electrical/instrumentation and control (I&C) systems.

2.1 SCOPING AND SCREENING METHODOLOGY

Scoping is the evaluation performed to identify SSCs that satisfy the criteria in 10 CFR 54.4. Based on the nature and content of design information systems at Turkey Point, scoping as defined in 10 CFR 54.4 was performed in two steps: (1) plant level scoping, and (2) component and structural component scoping. For the first step, an evaluation was performed to identify systems and structures that satisfy the criteria in 10 CFR 54.4. This is designated as plant level scoping and is described in Subsection 2.1.1. For the second step, the systems and major structures identified as satisfying the criteria in 10 CFR 54.4 were further evaluated to identify the specific components and structural components that satisfy the criteria in 10 CFR 54.4 and, therefore, are in the scope of license renewal.

Once the in-scope components and structural components were identified, they were screened to identify those subject to an aging management review in accordance with 10 CFR 54.21(a)(1). The component and structural component scoping and screening process is described in Subsection 2.1.2.

2.1.1 PLANT LEVEL SCOPING

Plant level scoping begins by defining the plant in terms of major systems and structures. These systems and structures are then evaluated against the scoping criteria in 10 CFR 54.4.

Specifically, 10 CFR 54.4 states that:

"(a) Plant systems, structures, and components within the scope of this part are-

(1) Safety-related systems, structures, and components which are those relied upon to remain functional during and following design basis events [as defined in 10 CFR 50.49(b)(1)] to ensure the following functions-

(i) The integrity of the reactor coolant pressure boundary;

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

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

(2) All non-safety related systems, structures, and components whose failure could prevent satisfactory accomplishment of any of the functions identified in paragraphs (a)(1)(i), (ii), or (iii) of this section.

(3) All systems, structures, and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), pressurized thermal shock (10 CFR 50.61), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

(b) The intended functions that these systems, structures, and components must be shown to fulfill in §54.21 are those functions that are the bases for including them within the scope of license renewal as specified in paragraphs (a)(1) - (3) of this section."

The scoping process to identify systems and structures that satisfy the requirements of 10 CFR 54.4(a)(1), 10 CFR 54.4(a)(2), and 10 CFR 54.4(a)(3) is performed on systems and structures using documents which form the Current Licensing Basis (CLB) and other information sources. The CLB for Turkey Point Units 3 and 4 has been defined in accordance with the definition provided in 10 CFR 54.3. The key information sources that form the CLB include the UFSAR, Technical Specifications, and the docketed licensing correspondence. Other important information sources used for scoping are further described in Subsection 2.1.1.1.

The scoping process utilized by Turkey Point considers the guidance provided by the NRC in its letter from Christopher I. Grimes to Douglas J. Walters of the Nuclear Energy Institute (NEI) dated August 5, 1999, entitled, "License Renewal Issue No. 98-0082, Scoping Guidance" [Reference 2.1-2].

The aspects of the scoping process used to identify systems and structures that satisfy the requirements of 10 CFR 54.4(a)(1), 10 CFR 54.4(a)(2), and 10 CFR 54.4(a)(3) are described in Subsections 2.1.1.2, 2.1.1.3, and 2.1.1.4 respectively.

2.1.1.1 INFORMATION SOURCES

In addition to the UFSAR, Technical Specifications, and docketed licensing correspondence, three information sources – the design basis documents, the component database, and piping and instrumentation diagrams (P&IDs) – were relied upon to a great extent in performing scoping and screening for Turkey Point. A brief discussion of these sources is provided.

2.1.1.1.1 DESIGN BASIS DOCUMENTS

In response to a NRC Safety System Functional Inspection on the Turkey Point Auxiliary Feedwater System, performed in August 1985, design basis documents were prepared for eighteen support and accident mitigation systems, selected licensing issues, and UFSAR Chapter 14 accident analyses. Design basis documents are a tool to explain the requirements behind the design rather than describing the design itself. Design basis documents are intended to complement other upper tier documents, such as the UFSAR and Technical Specifications, and are controlled and updated.

2.1.1.1.2 COMPONENT DATABASE

Specific component information for SSCs at Turkey Point 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, safety classification bases, and component tag, type, and description.

2.1.1.1.3 P&IDs

Turkey Point was designed and built prior to the issuance of present day nuclear power plant guidance documents for American Society of Mechanical Engineers (ASME) Code boundaries and quality group classifications. Quality group classifications for Turkey Point were established considering the Turkey Point CLB and various industry codes and standards, including Regulatory Guide 1.26, 10 CFR 50.55a, and ASME Section XI. Quality group classification boundaries for safety-related systems are delineated on P&IDs and provide a basis for ASME Section XI programs.

Various reference documents refer to "ASME Section III Code Class 1, 2, and 3," or "Safety Class 1, 2, and 3" for safety-related components. The corresponding classifications reflected on the P&IDs for Turkey Point Units 3 and 4 are uniformly referred to as "Quality Group A, B, and C." The classification "SR" has been used to identify those systems or portions of systems that are important to safety, but for which there are no specific commitments contained within the ASME Section XI program.

2.1.1.2 SAFETY-RELATED CRITERIA PURSUANT TO 10 CFR 54.4(a)(1)

10 CFR 54.4(a)(1) states that SSCs within the scope of license renewal include safety-related SSCs that are relied upon to remain functional during and following design basis events [as defined in 10 CFR 50.49(b)(1)] to ensure the following functions:

- the integrity of the reactor coolant pressure boundary;
- the capability to shut down the reactor and maintain it in a safe shutdown condition; or

- the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposure comparable to the 10 CFR Part 100 guidelines.

In the mid-1980s, Turkey Point established safety classifications for systems and structures at the component level consistent with the definition of safety-related SSCs provided in the FPL Quality Assurance Program and the Turkey Point CLB. This definition of safety related encompasses the definition of safety related specified in 10 CFR 54.4(a)(1).

Safety classifications of SSCs were included in the component database and were established based on reliance on the SSCs during and following design basis events, which include design basis accidents, anticipated operational occurrences, natural phenomena, and external events. The design basis events considered are consistent with the Turkey Point CLB. UFSAR Chapter 14 provides the design basis event accident analyses for Turkey Point Units 3 and 4.

Natural phenomena and external events are described in Chapter 2 of the UFSAR and in appropriate sections of the design basis documents. Structures designed to withstand design basis events, natural phenomena, and external events are described in UFSAR Chapter 5.

Two of the design basis events, Accidental Liquid Release and Accidental Gas Release, are analyzed for offsite radiological consequences and do not involve analyses related to the reactor coolant pressure boundary or the capability to shut down the reactor and maintain it in a safe shutdown condition. Table 2.1-1 provides the radiological consequences of these design basis events from UFSAR Subsections 14.2.2 and 14.2.3 The offsite dose analyses indicate that the radiological consequences of Accidental Liquid Release and Accidental Gas Release are small fractions of 10 CFR 100 limits. As a result, the 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). However, these SSCs were evaluated for possible inclusion in the license renewal scope relative to the criteria of 10 CFR 54.4(a)(2) and (a)(3).

The steps to identify systems and structures at Turkey Point that meet the criteria of 10 CFR 54.4(a)(1) are outlined below:

- The UFSAR, Technical Specifications, licensing correspondence, design basis documents, component database, and design drawings were reviewed, as applicable.
- Based on the above, license renewal intended functions relative to the criteria of 10 CFR 54.4(a)(1) were identified for each system and structure determined to be safety related.

The scoping process to identify safety-related systems and structures for Turkey Point is consistent with and satisfies the criteria in 10 CFR 54.4(a)(1).

2.1.1.3 NON-SAFETY RELATED CRITERIA PURSUANT TO 10 CFR 54.4(a)(2)

10 CFR 54.4(a)(2) states that SSCs within the scope of license renewal include non-safety related SSCs whose failure could prevent satisfactory accomplishment of any of the functions identified for safety-related SSCs.

At Turkey Point, non-safety related SSCs whose failure could impact safety-related SSCs carry an augmented quality classification (Quality Related) and are included in the FPL Quality Assurance Program. The non-safety related SSCs that are within the scope of license renewal for Turkey Point fall into two categories:

- Non-safety related SSCs that functionally support the operation of safety-related SSCs, and
- 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).

With regard to non-safety related SSCs that functionally support the operation of safety-related SSCs, there are several systems and structures in this category, including non-safety related ventilation systems that cool safety-related areas, and non-safety related piping segments that provide structural support at safety-related/non-safety related boundaries. SSCs associated with these systems and structures are classified "Quality Related" in the component database.

For non-safety related piping segments, safety-related/non-safety related functional boundaries for piping systems are made at system pressure boundary valves. The structural integrity boundary may extend beyond the system pressure boundary valve. The structural integrity support system includes the piping segments and supports that provide structural support for the boundary valve. These components ensure the integrity of the safety-related/non-safety related functional system

pressure boundary under all design basis loading conditions and are conservatively assumed to meet the scoping criteria of 10 CFR 54.4(a)(2).

The second category involves the potential for non-safety related systems or structures to impact the ability of safety-related systems or structures to perform their intended functions. To complete this portion of the scoping effort, a systematic review of potential non-safety related/safety-related interactions was performed. The UFSAR, licensing correspondence, and design basis documents were relied upon in addressing these interactions. For most of the potential interactions, failure of the non-safety related system or structure is assumed to occur, and design features are provided to accommodate the failure. Examples include internal flooding (protective design feature: sump pumps and drainage), and internal missiles (protective design feature: buildings, missile barriers, and enclosures). In these situations, the design features are considered to be in the scope of license renewal, not the non-safety related system or structure that is assumed to fail.

For other potential interactions, the non-safety related system or structure has the design capability to preclude the interaction with safety-related systems or structures. The primary interaction for this case is related to seismic design. Turkey Point's approach to scoping and screening of non-safety related systems or structures that have the potential for seismic interaction with safety related systems or structures is described in more detail below.

Non-seismic systems or structures that are positioned above or in close proximity to safety-related systems or structures, and whose failure during a seismic event could cause the subsequent failure of the safety-related systems or structures, are commonly referred to as "seismic II over I" or seismic interaction. It is important to note that Turkey Point Units 3 and 4 were not originally licensed for "seismic II over I." However, "seismic II over I" was considered for license renewal scoping.

For seismic interactions, Turkey Point has chosen an area-based approach to scoping, because the seismic interaction design feature is dependent upon the location of the non-safety related system or structure relative to safety-related systems and structures. The approach utilized identifies the major structures of the plant containing both safety-related and non-safety related systems and structures. Component and structural component level scoping performed as part of the screening process (see Subsection 2.1.2.2) then establishes the specific non-safety related seismic interaction component/structural component types located within these structures for inclusion in the license renewal scope. Based on this approach,

non-safety related components and structural components with the potential for seismic interactions are identified as in the scope of license renewal.

The steps to identify non-safety related systems and structures at Turkey Point that meet the criteria of 10 CFR 54.4(a)(2) are outlined below:

- The UFSAR, Technical Specifications, licensing correspondence, design basis documents, component database, pipe stress analyses, and design drawings were reviewed, as applicable.
- Based on the above, license renewal intended functions relative to the criteria of 10 CFR 54.4(a)(2) were identified for each system and structure determined to be non-safety related whose failure could affect safety-related SSCs.

The scoping process to identify non-safety related systems and structures whose failure can affect safety-related systems and structures for Turkey Point is consistent with and satisfies the criteria in 10 CFR 54.4(a)(2).

2.1.1.4 OTHER SCOPING PURSUANT TO 10 CFR 54.4(a)(3)

10 CFR 54.4(a)(3) states that SSCs within the scope of license renewal include all systems and structures relied on in safety analyses or plant evaluations to demonstrate compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), pressurized thermal shock (10 CFR 50.61), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

Scoping based on each of these regulations is described in the following sections.

2.1.1.4.1 FIRE PROTECTION (FP)

Fire protection features and commitments are described in detail in Appendix 9.6A of the UFSAR and the design basis documents. The systems and structures at Turkey Point that support the multiple levels of protection for postulated fires are considered within the scope of license renewal. At Turkey Point, non-safety related SSCs relied on for fire protection carry an augmented quality classification (Quality Related) and are included in the FPL Quality Assurance Program.

In addition to the Turkey Point UFSAR, licensing correspondence, and design basis documents, two primary information sources utilized in performing this portion of the

scoping effort were the Turkey Point Safe Shutdown Analysis and the Essential Equipment List.

With regard to the Safe Shutdown Analysis, Section III.G.1 of Appendix R to 10 CFR 50 requires that fire protection features be provided for systems, structures, and components important to safe shutdown. In order to meet these requirements for Turkey Point, equipment required for safe shutdown, including the associated power and control cables, and equipment that could adversely affect safe shutdown if spuriously actuated by fire-induced faults, have been identified for every fire area in the plant in order to assess the fire protection required.

The Essential Equipment List was developed as the first step of the Turkey Point safe shutdown analysis process. This list, which defines the minimum equipment necessary to bring the plant to cold shutdown, contains all power generation and distribution equipment (e.g., diesel generators, batteries, switchgear, motor control centers, power panels) that is required for the operation of the listed equipment. In addition, the list includes equipment that, although not required for safe shutdown, could adversely affect safe shutdown if spuriously actuated by a fire-induced electrical fault. One feature of Turkey Point's Essential Equipment List is that no equipment in storage is credited for safe shutdown.

The steps to identify systems and structures relied upon for Fire Protection at Turkey Point that meet the associated criterion of 10 CFR 54.4(a)(3) are outlined below:

- The UFSAR, Technical Specifications, Essential Equipment List, Safe Shutdown Analysis, licensing correspondence, design basis documents, component database, and design drawings were reviewed, as applicable.
- Based on the above, license renewal intended functions relative to the criterion of 10 CFR 54.4(a)(3) for fire protection were identified for each system and structure determined to meet this criterion.

The scoping process to identify systems and structures relied upon and/or specifically committed to for fire protection for Turkey Point is consistent with and satisfies the associated criterion in 10 CFR 54.4(a)(3).

2.1.1.4.2 ENVIRONMENTAL QUALIFICATION (EQ)

Certain safety-related electrical components are required to withstand environmental conditions that may occur during or following a design basis accident per 10 CFR 50.49. The criteria for determining which equipment requires environmental

qualification are indicated in UFSAR Appendix 8A.3 and are identified on the Turkey Point Environmental Qualification (EQ) List for 10 CFR 50.49. Time-Limited Aging Analyses associated with environmentally qualified equipment are discussed in Subsection 4.4.1.

For non-safety related electrical components whose failure under postulated environmental conditions could prevent satisfactory accomplishment of safety functions, Turkey Point elected not to differentiate between safety-related and non-safety related components. If failure of an electrical component can affect safety-related functions, that electrical component is treated as safety-related for environmental qualification purposes.

The steps to identify systems and structures subject to environmental qualification at Turkey Point that meet the associated criterion of 10 CFR 54.4(a)(3) are outlined below:

- The UFSAR, Technical Specifications, licensing correspondence, Environmental Qualification List, and design basis documents were reviewed, as applicable.
- Based on the above, license renewal intended functions relative to the criterion of 10 CFR 54.4(a)(3) for environmental qualification were identified for each system and structure determined to meet this criterion.

The scoping process to identify systems and structures relied upon and/or specifically committed to for environmental qualification for Turkey Point is consistent with and satisfies the associated criterion in 10 CFR 54.4(a)(3).

2.1.1.4.3 PRESSURIZED THERMAL SHOCK (PTS)

10 CFR 50.61, "Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events", requires that licensees evaluate the reactor vessel beltline materials against specific criteria to ensure protection against brittle fracture. See references 2.1-4 through 2.1-7 for a listing of Turkey Point licensing correspondence related to pressurized thermal shock.

The steps to identify systems and structures relied upon for protection against pressurized thermal shock at Turkey Point that meet the associated criterion of 10 CFR 54.4(a)(3) are outlined below:

- The UFSAR, Technical Specifications, licensing correspondence, design basis documents, component database, and design drawings were reviewed, as applicable.
- Based on the above, the only components relied upon for protection against pressurized thermal shock are the reactor vessels. Analyses applicable to pressurized thermal shock have been reevaluated and demonstrated that the reactors vessels meet the screening criteria at the end of the extended period of operation (see Subsection 4.2.1).

The scoping process to identify systems and structures relied upon and/or specifically committed to for pressurized thermal shock for Turkey Point is consistent with and satisfies the associated criterion in 10 CFR 54.4(a)(3).

2.1.1.4.4 ANTICIPATED TRANSIENTS WITHOUT SCRAM (ATWS)

Turkey Point design features related to anticipated transients without scram events are described in detail in UFSAR Section 7.2.4.

The steps to identify systems and structures relied upon for anticipated transients without scram at Turkey Point that meet the associated criterion of 10 CFR 54.4(a)(3) are outlined below:

- The UFSAR, Technical Specifications, licensing correspondence, design basis documents, component database, and design drawings were reviewed, as applicable.
- Based on the above, license renewal intended functions relative to the criterion of 10 CFR 54.4(a)(3) for anticipated transients without scram events were identified for each system and structure determined to meet this criterion.

The scoping process to identify systems and structures relied upon and/or specifically committed to for anticipated transient without scram events for Turkey Point is consistent with and satisfies the associated criterion in 10 CFR 54.4(a)(3).

2.1.1.4.5 STATION BLACKOUT (SBO)

The UFSAR and design basis documents provide the licensing criteria that are the bases for Turkey Point's resolution to station blackout. Design features to satisfy the Station Blackout Rule are described in UFSAR Section 8.2.2.2. Turkey Point

licensing correspondence related to station blackout are listed as references 2.1-8 through 2.1-10.

The steps to identify systems and structures relied upon for station blackout at Turkey Point that meet the associated criterion of 10 CFR 54.4(a)(3) are outlined below:

- The UFSAR, Technical Specifications, licensing correspondence, design basis documents, component database, and design drawings were reviewed, as applicable.
- Based on the above, license renewal intended functions relative to the criterion of 10 CFR 54.4(a)(3) for station blackout were identified for each system and structure determined to meet this criterion.

The scoping process to identify systems and structures relied upon and/or specifically committed to for station blackout for Turkey Point is consistent with and satisfies the associated criterion in 10 CFR 54.4(a)(3).

2.1.2 COMPONENT/STRUCTURAL COMPONENT SCOPING AND SCREENING

This subsection discusses the process used at Turkey Point to: (1) identify components and structural components (collectively abbreviated as SCs) within the scope of license renewal for in-scope systems and structures; and (2) identify which of the SCs determined to be in-scope require an aging management review.

The requirement to identify SCs subject to an aging management review is specified in 10 CFR 54.21(a)(1) that states:

"Each application must contain the following information:

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

(1) For those systems, structures, and components within the scope of this part, as delineated in §54.4, identify and list those structures and components subject to an aging management review. Structures and components subject to an aging management review shall encompass those structures and components--

(i) That perform an intended function, as described in §54.4, without moving parts or without a change in configuration or properties. These structures and components include, but are not limited to, the reactor vessel, the reactor coolant system pressure boundary, steam generators, the pressurizer, piping, pump casings, valve bodies, the core shroud, component supports, pressure retaining boundaries, heat exchangers, ventilation ducts, the containment, the containment liner, electrical and mechanical penetrations, equipment hatches, seismic Category I structures, electrical cables and connections, cable trays, and electrical cabinets, excluding, but not limited to, pumps (except casing), valves (except body), motors, diesel generators, air compressors, snubbers, the control rod drive, ventilation dampers, pressure transmitters, pressure indicators, water level indicators, switchgears, cooling fans, transistors, batteries, breakers, relays, switches, power inverters, circuit boards, battery chargers, and power supplies; and

(ii) That are not subject to replacement based on a qualified life or specified time period."

This portion of Turkey Point's IPA methodology is divided into three engineering disciplines; mechanical, civil/structural, and electrical/I&C. The relevant aspects of the component/structural component scoping and screening process for mechanical systems, civil structures, and electrical/I&C systems are described in Subsections 2.1.2.1, 2.1.2.2, and 2.1.2.3, respectively.

For mechanical systems and civil structures, this process establishes evaluation boundaries, determines the SCs that compose the system or structure, determines which of those SCs support system/structure intended functions, and identifies specific SC intended functions. Consequently, not all of the SCs for in-scope systems or structures are in the scope of license renewal. Once these in-scope SCs are identified, the process then determines which SCs are subject to an aging management review per the criteria of 10 CFR 54.21(a)(1). Note that screening for Turkey Point is consistent with the NRC Staff's guidance on consumables provided in the NRC's March 10, 2000, letter from Christopher I. Grimes to Douglas J. Walters [Reference 2.1-3].

For electrical/I&C systems, a bounding approach as described in NEI 95-10 [Reference 2.1-1] is taken. This approach establishes evaluation boundaries, determines the electrical and I&C component commodity groups that compose in-scope systems, identifies specific component and commodity intended functions, and then determines which component commodity groups are subject to an aging management review per the criteria of 10 CFR 54.21(a)(1). This approach calls for component scoping after screening has been performed.

2.1.2.1 MECHANICAL SYSTEMS

For mechanical systems, the component/structural component scoping and screening process is performed on each system identified to be within the scope of license renewal. This process evaluates the individual SCs included within in-scope mechanical systems to identify specific SCs or SC groups that require an aging management review.

Mechanical system evaluation boundaries were established for each system within the scope of license renewal. These boundaries were determined by mapping the pressure boundary associated with license renewal system intended functions onto the system flow diagrams. License renewal system intended functions are the functions a system must perform relative to the scoping criteria of 10 CFR 54.4(a)(1), 10 CFR 54.4(a)(2), and 10 CFR 54.4(a)(3). The flow diagram

boundary drawings associated with each mechanical system within the scope of license renewal are identified with the mechanical system screening results described in Section 2.3.

The sequence of steps performed on each mechanical system determined to be within the scope of license renewal is as follows:

- Based on a review of design drawings and the system component list from the component database, SCs that are included within the system are identified.
- Based on the plant level scoping results, the pressure boundary associated with license renewal system intended functions is mapped onto the system's flow diagrams.
- The system SCs that are within the scope of license renewal (i.e., required to perform a license renewal system intended function) are identified.
- Component intended functions for in-scope SCs are identified. The component intended functions identified are based on the guidance of NEI 95-10 [Reference 2.1-1].
- The in-scope SCs that perform an intended function without moving parts or without a change in configuration or properties [screening criterion of 10 CFR 54.21(a)(1)(i)] are identified. Active/passive screening determinations are based on the guidance in Appendix B to NEI 95-10 [Reference 2.1-1].
- The passive, in-scope SCs that are not subject to replacement based on a qualified life or specified time period [screening criterion of 10 CFR 54.21(a)(1)(ii)] are identified as requiring an aging management review. The determination of whether passive, in-scope SC has a qualified life or specified replacement time period was based on a review of plant-specific information, including the component database, maintenance programs, and procedures.

2.1.2.2 CIVIL STRUCTURES

For structures, the component/structural component scoping and screening process is performed on each structure identified to be within the scope of license renewal. This method evaluates the individual SCs included within in-scope structures to identify specific SCs or SC groups that require an aging management review.

The sequence of steps performed on each structure determined to be within the scope of license renewal is as follows:

- Based on a review of design drawings, the structure component list from the component database, and plant walkdowns, SCs that are included within the structure are identified. These SCs include items such as walls, supports, and non-current carrying electrical and instrumentation and control 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 identified.
- Design features and associated SCs that prevent potential seismic interactions for in-scope structures housing both safety-related and non-safety related systems are identified. This includes a walkdown of each plant area containing both safety-related and non-safety related SSCs.
- Component intended functions for in-scope SCs are identified. The component intended functions identified are based on the guidance of NEI 95-10 [Reference 2.1-1].
- The in-scope SCs that perform an intended function without moving parts or without a change in configuration or properties [screening criterion of 10 CFR 54.21(a)(1)(i)] are identified. Active/passive screening determinations are based on the guidance in Appendix B to NEI 95-10 [Reference 2.1-1].
- The passive, in-scope SCs that are not subject to replacement based on a qualified life or specified time period [screening criterion of 10 CFR 54.21(a)(1)(ii)] are identified as requiring an aging management review. The determination of whether a passive, in-scope SC has a qualified life or specified replacement time period was based on a review of plant-specific information, including the component database, maintenance programs and procedures, vendor manuals, and plant experience.

2.1.2.3 ELECTRICAL AND I&C SYSTEMS

The method used to determine which electrical and I&C components are subject to an aging management review is organized based on component commodity groups. 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 and I&C components since most electrical and I&C components are active. Thus, the method selected provides the most efficient means for determining electrical and I&C components that require an aging management review. The method employed is consistent with the guidance in NEI 95-10 [Reference 2.1-1].

The sequence of steps for identification of electrical and I&C components that require an aging management review is as follows:

- Electrical and I&C component commodity groups associated with electrical, instrumentation and control, and mechanical systems within the scope of license renewal are identified. This step includes a complete review of design drawings and electrical and I&C component commodity groups in the component database.
- A description and function for each of the electrical and I&C component commodity groups are identified.
- The electrical and I&C component commodity groups that perform an intended function without moving parts or without a change in configuration or properties [screening criterion of 10 CFR 54.21(a)(1)(i)] are identified. Active/passive screening determinations are based on the guidance in Appendix B to NEI 95-10 [Reference 2.1-1].
- For the passive electrical and I&C component commodity groups, component commodity groups that are not subject to replacement based on a qualified life or specified time period [screening criterion of 10 CFR 54.21(a)(1)(ii)] are identified as requiring an aging management review. Electrical and I&C component commodity groups covered by the 10 CFR 50.49 Environmental Qualification Program are considered to be subject to replacement based on qualified life.
- Certain passive, long-lived electrical and I&C component commodity groups that do not support license renewal system intended functions are eliminated.

2.1.3 GENERIC SAFETY ISSUES

In accordance with the guidance in NEI 95-10 [Reference 2.1-1] and Appendix A of the draft "Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants" [Reference 2.1-11], review of NRC generic safety issues (GSIs) as part of the license renewal process is required to satisfy a finding per 10 CFR 54.29. GSIs that involve issues related to license renewal aging management reviews or time-limited aging analysis evaluations are to be addressed in the License Renewal Application. Based on NEI and NRC guidance, NUREG-0933 [Reference 2.1-12], and previous license renewal applicants, Turkey Point has identified the following GSIs to be addressed:

- GSI 168, Environmental Qualification of Electrical Equipment – This GSI is related to aging concerns with respect to environmental qualification of electrical equipment. Environmental qualification evaluations of electrical equipment are identified as time-limited aging analyses for Turkey Point Units 3 and 4. Accordingly, this GSI is addressed in Subsection 4.4.2.
- GSI 190, Fatigue Evaluation of Metal Components for 60-year Plant Life – This GSI addresses fatigue life of metal components and was recently closed by the NRC [Reference 2.1-13]. In the closure letter, however, the NRC concluded that licensees should address the effects of reactor coolant environment on component fatigue life as aging management programs are formulated in support of license renewal. Accordingly, the issue of environmental effects on component fatigue life is addressed in Subsection 4.3.5.

2.1.4 CONCLUSION

The methods described in Subsections 2.1.1 and 2.1.2 were used for the Turkey Point Units 3 and 4 IPA to identify the systems, structures, and components that are within the scope of license renewal and require an aging management review. The methods are consistent with and satisfy the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1).

2.1.5 REFERENCES

2.1-1 NEI 95-10, "Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 – The License Renewal Rule," Revision 1, Nuclear Energy Institute, January 2000.

2.1-2 C. I. Grimes (NRC) letter to D. J. Walters (NEI), "License Renewal Issue No. 98-0082, Scoping Guidance," August 5, 1999.

2.1-3 C. I. Grimes (NRC) letter to D. J. Walters (NEI), "License Renewal Issue No. 98-12, Consumables," March 10, 2000.

2.1-4 C. O. Woody (FPL) letter to H. G. Thompson (NRC), "Turkey Points Units 3 and 4 -10 CFR 50.61(b)(1) Report," January 23, 1986.

2.1-5 D. G. McDonald (NRC) letter to C. O. Woody (FPL), "Projected Values of Material Properties For Fracture Toughness Requirements For Protection Against Pressurized Thermal Shock Events - Turkey Point Plant, Units 3 and 4," March 11, 1987.

2.1-6 T. F. Plunkett (FPL) letter to U. S. Nuclear Regulatory Commission, "Turkey Points Units 3 and 4 - 10 CFR 50.61(b)(1) Report," February 13, 1992.

2.1-7 The NRC Safety Evaluation on the amendment to recapture the construction period for Turkey Point, April 20, 1994.

2.1-8 W. F. Conway (FPL) letter to U. S. Nuclear Regulatory Commission, "Information to Resolve Station Blackout," April 17, 1989.

2.1-9 G. E. Edison (NRC) letter to J. H. Goldberg (FPL),"Turkey Point Units 3 and 4 - Safety Evaluation for Proposed Implementation of the Station Blackout Rule (10 CFR 50.63) (TAC Nos. 68618 and 68619)," June 15, 1990.

2.1-10 R. Auluck (NRC) letter to J. H. Goldberg (FPL),"Turkey Point Units 3 and 4 - Supplemental Safety Evaluation for Proposed Implementation of the Station Blackout Rule (10 CFR 50.63) (TAC Nos. 81159 and 81160)," July 31, 1991.

2.1-11 NRC draft, "Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants," April 21, 2000.

2.1-12 NUREG-0933, "A Prioritization of Generic Safety Issues," Supplement 23, April 1999.

2.1-13 Memorandum, Ashok C. Thadani, Director, Office of Nuclear Regulatory Research, to William D. Travers, Executive Director of Operations - Closeout of Generic Safety Issue 190, "Fatigue Evaluation of Metal Components for 60 Year Plant Life," U. S. Nuclear Regulatory Commission, December 26, 1999.

TABLE 2.1-1
RADIOLOGICAL CONSEQUENCES OF ACCIDENTAL RELEASES

Design Basis Event	Whole Body		Thyroid	
	EB[1]	LPZ[2]	EB[1]	LPZ[2]
10 CFR 100 Limits	25 Rem	25 Rem	300 Rem	300 Rem
Accidental Liquid Release	Negligible	Negligible	Negligible	Negligible
Accidental Gas Release	.064 Rem	.0062 Rem	Negligible	Negligible

NOTES: 1. Exclusion Boundary, 0-2 hours
2. Low Population Zone, 0-2 hours

2.2 PLANT LEVEL SCOPING RESULTS

Turkey Point's Integrated Plant Assessment (IPA) methodology consists of scoping, screening, and aging management reviews. This section provides the plant level scoping results achieved when applying the scoping methodology described in Subsection 2.1.1 to plant systems and structures. Tables 2.2-1, 2.2-2, and 2.2-3 provide the plant level scoping results for mechanical systems, structures, and electrical/I&C systems, respectively. If a system or structure, in whole or in part, meets one or more of the license renewal scoping criteria, the system or structure is considered to be within the scope of license renewal. Also included in the tables are references to the sections in the application that discuss screening results for in-scope systems and structures.

Figure 2.2-1 provides a layout of Turkey Point Units 3 and 4 and identifies the structures within the scope of license renewal in bold. Figure 2.2-2 provides a layout of the structural components included in the structure identified as "Yard Structures."

TABLE 2.2-1
LICENSE RENEWAL SCOPING RESULTS FOR MECHANICAL SYSTEMS

System Name	System in License Renewal Scope?	Screening Results Application Subsection
Amertap	No	
Auxiliary Building Ventilation	Yes	2.3.3.10
Auxiliary Feedwater and Condensate Storage	Yes	2.3.4.3
Auxiliary Steam	No	
Circulating Cooling Water	No	
Component Cooling Water	Yes	2.3.3.2
Condensate	No	
Condensate Polishing	No	
Condensate Recovery	No	
Condenser	No	
Containment Isolation	Yes	2.3.2.3
Containment Post-Accident Monitoring and Control	Yes	2.3.2.7
Containment Spray	Yes	2.3.2.2
Control Building Ventilation	Yes	2.3.3.11
Chemical and Volume Control	Yes	2.3.3.4
Electrical Equipment Room Ventilation	Yes	2.3.3.10
Emergency Containment Cooling	Yes	2.3.2.1
Emergency Containment Filtration	Yes	2.3.2.6
Emergency Diesel Generator and Support Systems	Yes	2.3.3.15
Emergency Diesel Generator Building Ventilation	Yes	2.3.3.12
Environmental Monitoring	No	
Extraction Steam	No	
Feedwater and Blowdown	Yes	2.3.4.2
Feedwater Heaters, Drains, and Vents	No	
Fire Protection	Yes	2.3.3.14
Gland Steam and Drains	No	
Instrument Air	Yes	2.3.3.8
Intake Cooling Water	Yes	2.3.3.1
Main Steam and Turbine Generators	Yes	2.3.4.1
Metal Impact Monitoring	No	

TABLE 2.2-1 (continued)
LICENSE RENEWAL SCOPING RESULTS FOR MECHANICAL SYSTEMS

System Name	System in License Renewal Scope?	Screening Results Application Subsection
New Fuel Storage Area Ventilation	No	
Normal Containment and Control Rod Drive Mechanism Cooling	Yes	2.3.3.9
Penetration Cooling	No	
Primary Water Makeup	Yes	2.3.3.5
Radwaste Building Ventilation	No	
Reactor Coolant	Yes	2.3.1
Residual Heat Removal	Yes	2.3.2.5
Safety Injection	Yes	2.3.2.4
Sample System - NSSS and Secondary	Yes	2.3.3.6
Screen Wash and Chlorination	No	
Secondary Wet Layup	No	
Security	No	
Service (City) Water	No	
Spent Fuel Pool Cooling	Yes	2.3.3.3
Spent Fuel Storage Area Ventilation	No	
Steam Generator Wet Layup	No	
Turbine Building Ventilation	Yes	2.3.3.13
Turbine Lube Oil	No	
Turbine Plant Chemical Addition	No	
Turbine Plant Cooling Water	No	
Waste Disposal	Yes	2.3.3.7
Water Treatment Plant	No	

TABLE 2.2-2
LICENSE RENEWAL SCOPING RESULTS FOR STRUCTURES

Structure Name	Structure in License Renewal Scope?	Screening Results Application Subsection
Access Dress Facility	No	
Auxiliary Building (includes Fuel Handling Building and New Electrical Equipment Room)	Yes	2.4.2.1
"C" Bus Electrical Switchgear Enclosures	No	
Cafeteria	No	
Chemical Storage Building	No	
Cold Chemistry Lab	Yes	2.4.2.2
Containments	Yes	2.4.1
Control Building	Yes	2.4.2.3
Cooling Water Canals	Yes	2.4.2.4
Diesel Driven Fire Pump Enclosure	Yes	2.4.2.5
Discharge Structure	Yes	2.4.2.6
Dry Storage Warehouse	No	
Electrical Penetration Rooms	Yes	2.4.2.7
Emergency Diesel Generator Buildings	Yes	2.4.2.8
Fire Protection Monitoring Station	Yes	2.4.2.9
Fire Rated Assemblies	Yes	2.4.2.10
Hazardous Materials Storage Facility	No	
Health Physics Control Building	No	
Health Physics Truck Monitoring Building	No	
I&C Repair Facility	No	
Intake Structure	Yes	2.4.2.11
Machine Shop	No	
Main Steam and Feedwater Platforms	Yes	2.4.2.12
Main Truck Gate House	No	
Meteorological Towers	No	
New Fuel Storage and Handling	No	
Nuclear Administration Building	No	
Nuclear Administration Building Vault	No	
Nuclear Entrance Building	No	
Nuclear Maintenance Building	No	

TABLE 2.2-2 (continued)
LICENSE RENEWAL SCOPING RESULTS FOR STRUCTURES

Structure Name	Structure in License Renewal Scope?	Screening Results Application Subsection
Offsite Communications Tower	No	
Operator Radiation Controlled Area (RCA) Access Station	No	
Other Miscellaneous Buildings	No	
Plant Vent Stack	Yes	2.4.2.13
Polar Cranes	Yes	2.4.1
Radwaste Building	No[1]	
Satellite Security Stations	No	
Self-Contained Breathing Apparatus (SCBA) Facility	No	
Security Barriers	No	
Spare Main Transformer	No	
Spent Fuel Storage and Handling	Yes	2.4.1 & 2.4.2.14
Steam Generator Storage Facility	No	
Switchyard Relay Enclosure	No	
Technical Support Center	No	
Turbine Building	Yes	2.4.2.15
Turbine Gantry Cranes	Yes	2.4.2.16
Turkey Point Units 1 and 2 Chimneys	Yes	2.4.2.17
Warehouse	No	
Water Treatment Plant	No	
Yard Structures (includes equipment foundations, concrete footings for structural steel supports, pipe trenches, and duct banks)	Yes	2.4.2.18

NOTE: 1. UFSAR Section 5.3-3 and Appendix 5A classify the Radwaste Building as Seismic Class 1. Considering the Radwaste Building does not house or protect safety-related SSCs and that the radiological consequences of accidental releases from postulated failures are a small fraction of 10 CFR 100 limits (see Table 2.1-1), the building does not meet the criteria of 10 CFR 54.4.

TABLE 2.2-3
LICENSE RENEWAL SCOPING RESULTS FOR ELECTRICAL/I&C SYSTEMS

System Name	System in License Renewal Scope?	Screening Results Application Section
125 VDC and 120 VAC	Yes	2.5
240 kV Switchyard	No	
4.16 kV	Yes	2.5
480 V Switchgear and Motor Control Centers	Yes	2.5
Annunciators	No	
Area Radiation Monitoring	No	
ATWS Mitigating System Actuation Circuitry (AMSAC)	Yes	2.5
Communications	Yes	2.5
Containment Electrical Penetrations (conductor and non-metallic portions)	Yes	2.5
Emergency Load Sequencer	Yes	2.5
Emergency Response Facility and Plant Computer	Yes	2.5
Engineering Safeguards	Yes	2.5
Fire and Smoke Detection	Yes	2.5
Lightning Protection	Yes	2.5
Main and Auxiliary Transformers	No	
Nuclear Instrumentation (Incore and Excore)	Yes	2.5
Plant Lighting	Yes	2.5
Process Radiation Monitoring	Yes	2.5
Qualified Safety Parameter Display System (QSPDS)	Yes	2.5
Reactivity Computer	No	
Reactor Protection	Yes	2.5
Start-Up Transformers	No	
Underwater TV Camera	No	

FIGURE 2.2-1
TURKEY POINT PLANT STRUCTURES

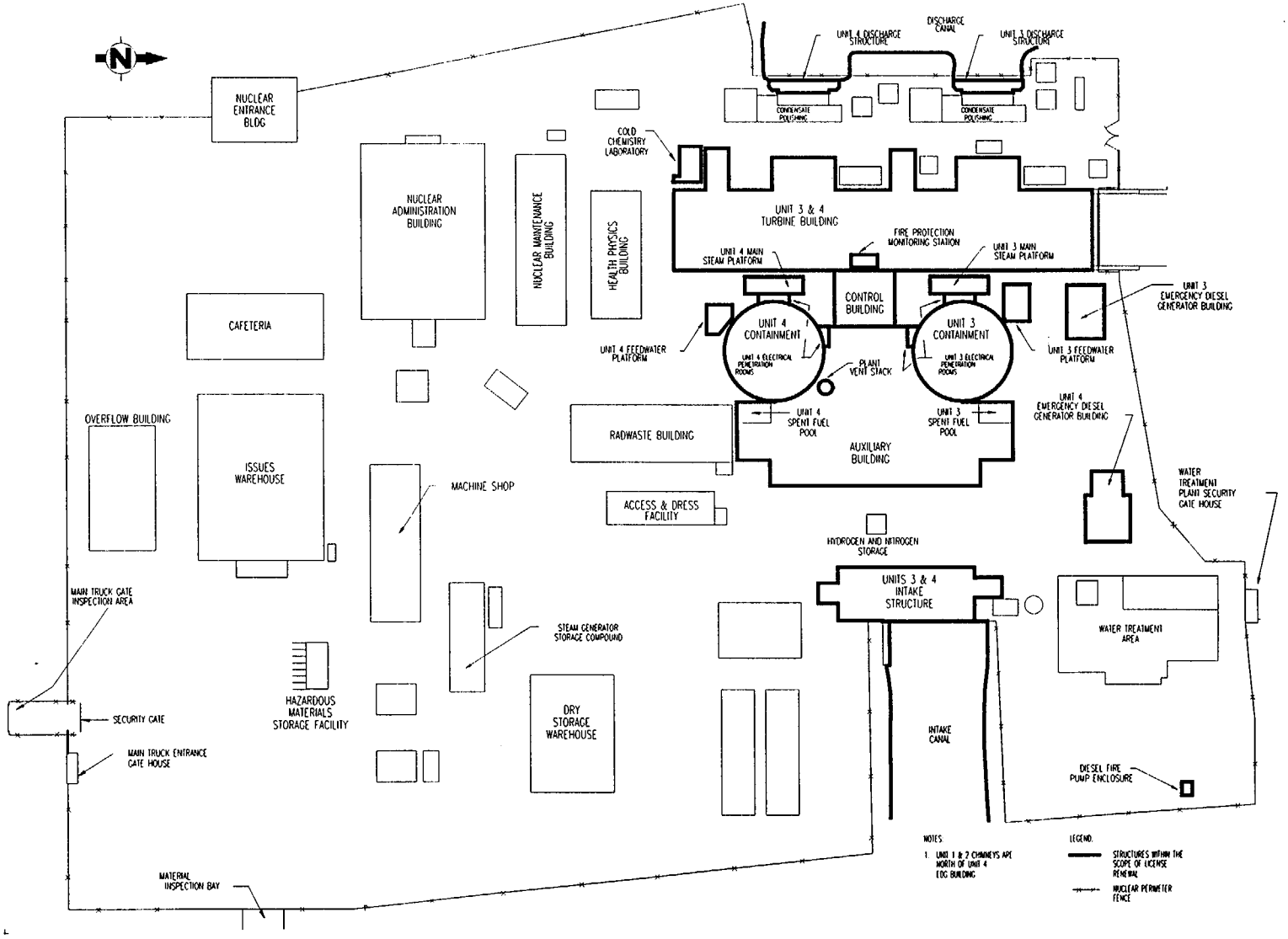
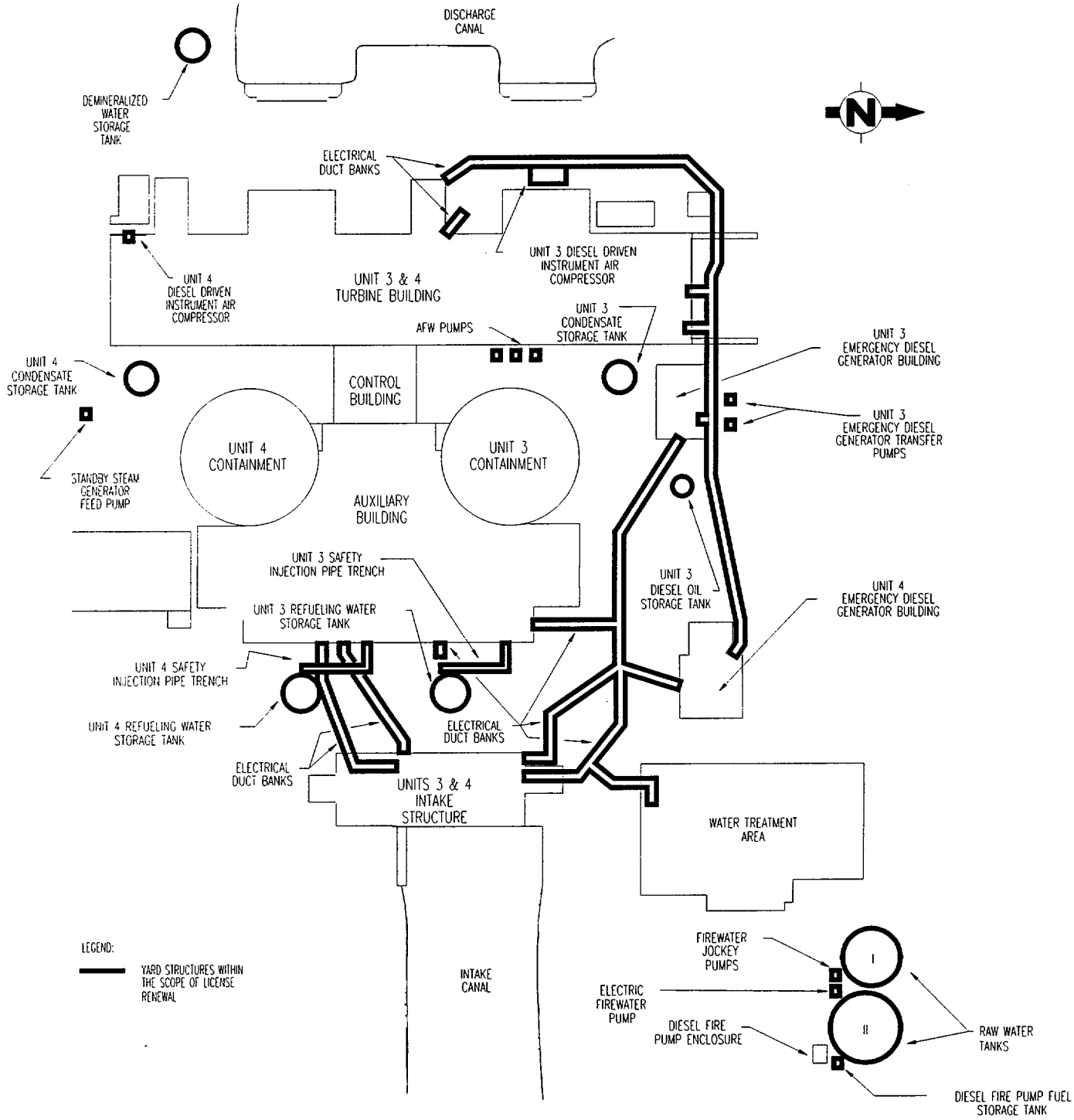


FIGURE 2.2-2
TURKEY POINT YARD STRUCTURES



2.3 SYSTEM SCOPING AND SCREENING RESULTS – MECHANICAL SYSTEMS

The determination of mechanical systems within the scope of license renewal is made by initially identifying Turkey Point mechanical systems and then reviewing them to determine which ones satisfy one or more of the criteria contained in 10 CFR 54.4. This process is described in Section 2.1 and the results of the mechanical systems review are contained in Section 2.2.

Section 2.1 also provides the methodology for determining the components within the scope of 10 CFR 54.4 that meet the requirements contained in 10 CFR 54.21(a)(1). The components that meet these screening requirements are identified in this section. These identified components subsequently require an aging management review for license renewal.

The screening results are provided below in four subsections:

- Reactor Coolant Systems
- Engineered Safety Features Systems
- Auxiliary Systems
- Steam and Power Conversion Systems.

2.3.1 REACTOR COOLANT SYSTEMS

The Reactor Coolant Systems consist of the systems and components designed to contain and support the nuclear fuel, contain the reactor coolant, and transfer the heat produced in the reactor to the steam and power conversion systems for the production of electricity.

Unless noted otherwise, the Reactor Coolant Systems for Turkey Point Units 3 and 4 are the same, with no components common to both units. The Reactor Coolant Systems are described in UFSAR Chapters 3 and 4. The following components are included in this subsection:

- Reactor Coolant Piping
- Regenerative and Excess Letdown Heat Exchangers
- Pressurizers
- Reactor Vessels
- Reactor Vessel Internals
- Reactor Coolant Pumps
- Steam Generators

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

Reactor Coolant System components subject to aging management review include the reactor vessel and control rod drive mechanism pressure boundary, pressurizers, steam generators, reactor vessel internals, reactor coolant pumps (pressure boundary only), and reactor coolant piping, valves (pressure boundary only), and fittings. The regenerative and excess letdown heat exchangers that are part of the Chemical and Volume Control System are also addressed in this subsection because they form a part of the Reactor Coolant System pressure boundary.

Class 1 as used in this application means the Safety Class 1 definition per American Nuclear Society (ANS) Standard N46.2.

The design code for reactor coolant piping is the 1955 Edition of American National Standards Institute (ANSI) B31.1 with the exception of the pressurizer surge lines that were analyzed to the 1986 Edition of the ASME Boiler and Pressure Vessel Code, Section III, Subsection NB. Class 1 piping starts at, and includes, the circumferential welds joining the piping to the Class 1 components and typically ends at the second normally closed valve from the Reactor Coolant System or the 3/8-inch flow restrictor in the piping.

The regenerative heat exchangers were designed and fabricated in accordance with the requirements of Tubular Exchanger Manufacturers Association (TEMA) Class R and the ASME Boiler and Pressure Vessel Code, Section III, Class C. The excess letdown heat exchangers were designed and fabricated in accordance with the requirements of TEMA Class R, the ASME Boiler and Pressure Vessel Code, Section III, Class C (tube side), and the ASME Boiler and Pressure Vessel Code, Section VIII (shell side).

The pressurizers were designed and fabricated in accordance with the requirements of the 1965 Edition of the ASME Boiler and Pressure Vessel Code.

The reactor vessels were manufactured by Babcock & Wilcox Co. in accordance with the design and fabrication requirements of the 1965 Edition of the ASME Boiler and Pressure Vessel Code, Section III, through the Summer 1966 Addenda.

The reactor vessel internals were designed prior to the creation of ASME Boiler and Pressure Vessel Code, Section III, Subsection NG, using internal Westinghouse design criteria that effectively evolved to become the original NG criteria. The reactor vessel internals were designed using the allowable stress levels of the 1965 Edition of the ASME Boiler and Pressure Vessel Code, Section III, Article 4, through the Summer 1966 Addenda.

The reactor coolant pump casings, main flanges, and main flange bolts were analyzed in accordance with the ASME Boiler and Pressure Vessel Code, Section III, Article 4.

The original steam generator components were designed and analyzed to the 1965 Edition of the ASME Boiler and Pressure Vessel Code, through Summer 1965 Addenda. The replacement steam generator components were constructed in accordance with the 1974 Edition of the ASME Boiler and Pressure Vessel Code, through Summer 1976 Addenda.

2.3.1.1 WESTINGHOUSE OWNERS GROUP GENERIC TECHNICAL REPORTS

Turkey Point actively participated in a Westinghouse Owners Group effort that developed a series of generic technical reports whose purpose was to demonstrate that the aging effects for Reactor Coolant System components are adequately managed for the period of extended operation. The following generic technical reports, applicable to Westinghouse Reactor Coolant Systems, have been submitted to the NRC for approval by Westinghouse:

- WCAP-14575, "License Renewal Evaluation: Aging Management Evaluation for Class 1 Piping and Associated Pressure Boundary Components" [References 2.3-1 through 2.3-3]. Draft NRC Safety Evaluation dated February 10, 2000 [Reference 2.3-4] has been issued.
- WCAP-14574, "License Renewal Evaluation: Aging Management Evaluation for Pressurizers" [References 2.3-3, 2.3-5, and 2.3-6]. Draft NRC Safety Evaluation dated August 7, 2000 [Reference 2.3-7] has been issued.
- WCAP-14577, "License Renewal Evaluation: Aging Management for Reactor Internals" [References 2.3-8 and 2.3-9]. Draft NRC Safety Evaluation has not been issued.
- WCAP-14422, "License Renewal Evaluation: Aging Management for Reactor Coolant System Supports" [Reference 2.3-10]. Draft NRC Safety Evaluation dated February 25, 2000 [Reference 2.3-11] has been issued. Note that the Reactor Coolant System supports are discussed in Section 2.4.1.

NRC-approved generic technical reports may be incorporated by reference in the Application pursuant to 10 CFR 54.17(e) provided the conditions of approval contained in the safety evaluation of the specific report are met. These reports are not incorporated by reference in the Turkey Point License Renewal Application because, as of September 1, 2000, none has received a final safety evaluation. However, to facilitate NRC review of these particular components, this Application addresses the applicability of these reports to the associated components at Turkey Point.

2.3.1.1.1 PROCESS FOR ESTABLISHING WESTINGHOUSE GENERIC TECHNICAL REPORT APPLICABILITY TO TURKEY POINT

Turkey Point used the following process to establish Westinghouse generic technical report applicability to the components.

1) Comparison of the component intended functions for the Reactor Coolant System components under review - The Turkey Point-specific component screening review first identifies the component intended functions and then compares these functions to those identified in the generic technical reports. Differences are noted and justification for the variances provided.

2) Identification of the items that are subject to aging management review - Turkey Point drawings and pertinent design and field change data are reviewed. The process establishes the full extent to which plant identified scope matches the scope identified in the generic technical reports. For those components that require an aging management review, a comparison of the component material and environment is considered in determining the extent to which the plant scope is bounded by the generic technical report. Areas not bounded are noted and evaluated.

3) Identification of the applicable aging effects - An independent assessment of the applicable aging effects is performed by reviewing plant operating environment, operating stresses, and plant-specific operating experience. This assessment reveals potential aging effects not identified in the generic technical reports. Aging effects for items that are determined to be subject to aging management review, that were not identified in the generic technical reports, are evaluated.

4) Review of Open Items and Applicant Action Items - In order to facilitate NRC review, open items and applicant action items are addressed if available prior to August 1, 2000.

Note that items (1), (2), and (4) are addressed in Sections 2.3.1 and 2.4.1. Item (3) is addressed in Sections 3.2 and 3.6.

2.3.1.2 REACTOR COOLANT PIPING

Reactor coolant piping consists of piping (including fittings, branch connections, safe ends, thermal sleeves, flow restrictors, and thermowells), pressure retaining parts of valves, and bolted closures and connections. Reactor coolant piping is presented in two parts:

- Class 1 piping
- Non-Class 1 piping.

2.3.1.2.1 CLASS 1 PIPING

Class 1 piping includes the main coolant piping; pressurizer surge, spray, safety, and relief lines; vents, drains, instrumentation lines; and Class 1 portions of ancillary systems attached to the Reactor Coolant System. Ancillary systems attached to the Reactor Coolant System include Residual Heat Removal, Safety Injection, Nuclear Steam Supply System Sampling, and Chemical and Volume Control. Reactor coolant piping is described in UFSAR Section 4.2.2.

The NRC issued a draft safety evaluation [Reference 2.3-4] on Westinghouse Owners Group generic technical report WCAP-14575, "License Renewal Evaluation: Aging Management Evaluation for Class 1 Piping and Associated Pressure Boundary Components" [References 2.3-1 through 2.3-3], on February 10, 2000.

Turkey Point reviewed the current design and operation of the reactor coolant piping using the process described in Subsection 2.3.1.1.1 and confirmed that the Turkey Point Class 1 piping is bounded by the description of Class 1 piping contained in WCAP-14575 with regard to design criteria and features, materials of construction, fabrication techniques, installed configuration, modes of operation, and environments/exposures. The component intended functions for Class 1 piping are inclusive of the intended functions identified in WCAP-14575. In addition to the functions identified in WCAP-14575, Turkey Point has identified an additional function for flow-restricting orifices and reducers. These orifices and reducers provide throttling to limit the maximum flow through a postulated break in an attached non-Class I line to a value within the makeup capability of the Chemical and Volume Control System.

As a result of the NRC review of WCAP-14575, several open items and applicant action items were identified and documented in the NRC draft safety evaluation.

The Turkey Point-specific responses to those open items and applicant action items relevant to the identification of reactor coolant piping components subject to aging management review are provided in Tables 2.3-2 and 2.3-3.

2.3.1.2.2 NON-CLASS 1 PIPING

Non-Class 1 piping is not within the scope of WCAP-14575. However, several non-Class 1 components are within the scope of license renewal. The component intended function of these in-scope non-Class 1 components is pressure boundary integrity. The non-Class 1 reactor coolant components requiring an aging management review include:

- Instrumentation tubing and fittings downstream of flow restrictors
- Inner reactor vessel flange O-ring leak detection line tubing, fittings and valves (pressure boundary only)
- Reactor vessel head vent piping, fittings, and valves (pressure boundary only) downstream of the restricting orifices
- Instrument air/nitrogen supply piping, tubing, fittings, accumulators, and valves (pressure boundary only) to the power operated relief valves
- Reactor coolant pump motor upper bearing oil heat exchanger and lower bearing oil cooling coil (the heat exchanger and cooling coil form a portion of the Component Cooling Water pressure boundary)

2.3.1.3 REGENERATIVE AND EXCESS LETDOWN HEAT EXCHANGERS

The regenerative and excess letdown heat exchangers are a part of Chemical and Volume Control. They are addressed in this subsection, however, because they are within the Reactor Coolant System pressure boundary. The regenerative and excess letdown heat exchangers are described in UFSAR Section 9.2.

The regenerative heat exchangers are of a multiple shell and U-tube design, each consisting of three heat exchangers interconnected in series by piping and mounted on a common support frame. The heat exchangers are designed to recover heat from the letdown stream by heating the charging stream, thus minimizing reactivity effects due to injection of cold water and minimizing thermal stress on the charging line penetrations in the reactor coolant loop piping. The letdown stream flows through the shell of the heat exchangers, and the charging stream flows through the tubes.

The excess letdown heat exchangers are of the U-tube design. Their function is to cool reactor coolant letdown flow equivalent to that portion of the nominal seal injection flow that enters the Reactor Coolant System through the labyrinth of the reactor coolant pump seals. They may be used when the normal letdown path is temporarily out of service or for supplementing the maximum letdown during heatup. The letdown is a four-pass flow through the tubes, while Component Cooling Water System flow is a single pass through the shells.

The component intended functions of the regenerative and excess letdown heat exchangers are pressure boundary integrity and heat transfer.

2.3.1.4 PRESSURIZERS

The pressurizers are vertical cylindrical vessels containing electric heaters in the lower heads and water spray nozzles in the upper heads. Since sources of heat in the Reactor Coolant Systems are interconnected by piping with no intervening isolation valves, relief protection for the Reactor Coolant Systems is provided on the pressurizers. Overpressure protection consists of three code safety valves and two power operated relief valves on each pressurizer. Piping attached to the pressurizer is Class 1 up to and including the second isolation valve (with the exception of the pressurizer code safety valves) and is discussed in Subsection 2.3.1.2. The pressurizers are described in UFSAR Section 4.2.2.

A draft safety evaluation for Westinghouse Owners Group generic technical report WCAP-14574, "License Renewal Evaluation: Aging Management Evaluation for Pressurizers" [References 2.3-3, 2.3-5, and 2.3-6], was issued on August 7, 2000 [Reference 2.3-7]. Turkey Point reviewed the current design and operation of the pressurizers using the process described in Subsection 2.3.1.1.1 and has confirmed that the Turkey Point pressurizers are bounded by the description contained in WCAP-14574. The component intended functions for the pressurizers are consistent with the intended functions identified in WCAP-14574.

2.3.1.5 REACTOR VESSELS

The reactor vessels consist of cylindrical vessel shells, lower vessel heads, closure heads, nozzles, interior attachments, and associated pressure-retaining bolting. The vessels are fabricated of low alloy steel with austenitic stainless steel cladding on internal surfaces exposed to the reactor coolant fluid. Coolant flow for each reactor vessel enters through three inlet nozzles in a plane just below the vessel flange and above the core. The coolant flows downward, through the annular space between

the vessel wall and the core barrel into a plenum at the bottom of the vessel, where it reverses direction, passes up through the core into the upper plenum, and then flows out of the vessel through three exit nozzles located on the same plane as the inlet nozzles. The component intended functions of the reactor vessels include pressure boundary integrity and structural support. The reactor vessels are described in UFSAR Chapter 3.

Control rod drive mechanism housings are attached to flanged nozzles, which penetrate the closure heads. The active portions of the control rod drive mechanisms do not require an aging management review per 10 CFR 54.21(a)(1)(i). The part-length control rod drive mechanisms, although they remain installed, are not being used at Turkey Point. Note that two of the part-length control rod drive mechanism housings on each reactor vessel have been modified for the installation of the Reactor Vessel Level Indication System. The control rod drive mechanism housings are threaded and seal welded to the reactor vessel head penetrations. The component intended function of the control rod drive mechanism housings is pressure boundary integrity. The control rod drive mechanisms are described in UFSAR Sections 3.1.3 and 3.2.3.

Bottom mounted instrumentation penetrates the reactor vessel lower head domes. The fifty (50) bottom head instrumentation tubes and attached bottom mounted guide tubes, flux thimble tubes, and seal table for each reactor vessel provide the capability of monitoring core flux distribution. The component intended function of the bottom mounted instrumentation is pressure boundary integrity. The bottom mounted instrumentation is described in UFSAR Section 3.2.3.

2.3.1.6 REACTOR VESSEL INTERNALS

The reactor vessel internals are designed to support, align, and guide the core components, and to support and guide incore instrumentation. The reactor vessel internals consist of two basic assemblies for each reactor vessel: an upper internals assembly that is removed during each refueling operation to obtain access to the reactor core; and a lower internals assembly that can be removed, if desired, following a complete core unload. The reactor vessel internals are described in UFSAR Chapter 3.

Each lower internals assembly is supported in the vessel by resting on a ledge below the vessel-head mating surface and is closely guided at the bottom by radial support/clevis assemblies. Each upper internals assembly is clamped at this same

ledge by the reactor vessel head. The bottom of the upper internals assembly is closely guided by the core barrel alignment pins of the lower internals assembly.

The lower internals comprise the core barrel, thermal shield, core baffle assembly, lower core plate, intermediate diffuser plate, bottom support casting, and supporting structures. The upper internals assembly (upper core support structure) is a rigid member composed of the top support plate and deep beam section, support columns, control rod guide tube assemblies, and the upper core plate. Upon upper internals assembly installation, the last three parts are physically located inside the core barrel.

The component intended functions of the reactor vessel internals are core support, coolant distribution, guidance and support of instrumentation and control rods, and vessel shielding.

A draft safety evaluation for Westinghouse Owners Group generic technical report WCAP-14577, "License Renewal Evaluation: Aging Management for Reactor Internals," [References 2.3-8 and 2.3-9], has not been issued. Turkey Point reviewed the current design and operation of the reactor vessel internals using the process described in Subsection 2.3.1.1.1 and has confirmed that the Turkey Point reactor vessel internals are bounded by the description contained in WCAP-14577. The component intended functions for the reactor vessel internals are consistent with the intended functions identified in WCAP-14577.

2.3.1.7 REACTOR COOLANT PUMPS

Each of the three reactor coolant loops for Turkey Point Units 3 and 4 contains a vertically mounted, single stage centrifugal reactor coolant pump that employs a controlled leakage seal assembly. The reactor coolant pumps provide the motive force for circulating the reactor coolant through the reactor core, piping, and steam generators. The reactor coolant pumps used at Turkey Point are Westinghouse Model 93. The component intended function of the reactor coolant pumps is pressure boundary integrity. The components that support this function include the casing, cover, pressure-retaining bolting, and integral thermal barrier heat exchanger. Non-Class 1 piping, instrumentation, and other components attached to the reactor coolant pumps are addressed in Subsection 2.3.1.2.2. The reactor coolant pump seals are not subject to an aging management review for the following reasons:

ledge by the reactor vessel head. The bottom of the upper internals assembly is closely guided by the core barrel alignment pins of the lower internals assembly.

The lower internals comprise the core barrel, thermal shield, core baffle assembly, lower core plate, intermediate diffuser plate, bottom support casting, and supporting structures. The upper internals assembly (upper core support structure) is a rigid member composed of the top support plate and deep beam section, support columns, control rod guide tube assemblies, and the upper core plate. Upon upper internals assembly installation, the last three parts are physically located inside the core barrel.

The component intended functions of the reactor vessel internals are core support, coolant distribution, guidance and support of instrumentation and control rods, and vessel shielding.

A draft safety evaluation for Westinghouse Owners Group generic technical report WCAP-14577, "License Renewal Evaluation: Aging Management for Reactor Internals," [References 2.3-8 and 2.3-9], has not been issued. Turkey Point reviewed the current design and operation of the reactor vessel internals using the process described in Subsection 2.3.1.1.1 and has confirmed that the Turkey Point reactor vessel internals are bounded by the description contained in WCAP-14577. The component intended functions for the reactor vessel internals are consistent with the intended functions identified in WCAP-14577.

2.3.1.7 REACTOR COOLANT PUMPS

Each of the three reactor coolant loops for Turkey Point Units 3 and 4 contains a vertically mounted, single stage centrifugal reactor coolant pump that employs a controlled leakage seal assembly. The reactor coolant pumps provide the motive force for circulating the reactor coolant through the reactor core, piping, and steam generators. The reactor coolant pumps used at Turkey Point are Westinghouse Model 93. The component intended function of the reactor coolant pumps is pressure boundary integrity. The components that support this function include the casing, cover, pressure-retaining bolting, and integral thermal barrier heat exchanger. Non-Class 1 piping, instrumentation, and other components attached to the reactor coolant pumps are addressed in Subsection 2.3.1.2.2. The reactor coolant pump seals are not subject to an aging management review 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 reactor coolant pump seal package and its constituent parts are routinely inspected and parts replaced, as required based on condition, for each reactor coolant pump.
- Plant operating experience has demonstrated the effectiveness of these activities.

Class 1 reactor coolant piping connected to the pumps, including the welded joints, is discussed in Subsection 2.3.1.2.1. The portions of the reactor coolant pump rotating elements above the pump coupling, including the electric motor and the flywheel, are not subject to aging management review in accordance with 10 CFR 54.21(a)(1)(i). The reactor coolant pumps are described in UFSAR Section 4.2.2.

The reactor coolant pumps are within the scope of WCAP-14575, "License Renewal Evaluation: Aging Management Evaluation for Class 1 Piping and Associated Pressure Boundary Components" [Reference 2.3-1 through 2.3-3]. The NRC draft safety evaluation [Reference 2.3-4] for WCAP-14575 was issued on February 10, 2000.

Turkey Point reviewed the current design and operation of the reactor coolant pumps using the process described in Subsection 2.3.1.1.1 and confirmed that the reactor coolant pumps are bounded by the description contained in WCAP-14575 with regard to design criteria and features, materials of construction, fabrication techniques, installed configuration, modes of operation, and environments/exposures. The component intended function for the reactor coolant pumps is also consistent with the intended function identified in WCAP-14575.

As a result of the NRC review of WCAP-14575, several open items and applicant action items were identified and documented in the NRC draft safety evaluation. The Turkey Point-specific responses to those open items and applicant action items relevant to the identification of reactor coolant pump components subject to aging management review are provided in Tables 2.3-2 and 2.3-3.

2.3.1.8 STEAM GENERATORS

There are three steam generators installed in each unit. One steam generator is installed in each reactor coolant loop. Each steam generator is a vertical shell and

tube heat exchanger, which transfers heat from a single-phase fluid at high temperature and pressure (the reactor coolant) in the tube side, to a two-phase (steam-water) mixture at lower temperature and pressure in the shell side. The steam generators are described in the UFSAR Section 4.2.2.

The reactor coolant enters and exits the tube side of each steam generator through nozzles located in the lower hemispherical head. The Reactor Coolant System fluid flows through inverted U-tubes connected to the tube sheet. The lower head is divided into inlet and outlet chambers by a vertical partition plate extending from the lower head to the tube sheet. The steam-water mixture is generated on the secondary, or shell side, and flows upward through moisture separators and dryers to the outlet nozzle at the top of the vessel, providing essentially dry, saturated steam. Manways are provided to permit access to both sides of the lower head and to the U-tubes and moisture separating equipment on the shell side of the steam generators.

The component intended functions of the steam generators include pressure boundary integrity, heat transfer, flow distribution, structural support, and throttling.

2.3.1.9 SUMMARY

The Reactor Coolant 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 safety-related functions
- SCs that are a part of the Environmental Qualification Program
- SCs that are relied on during certain postulated fire, station blackout, pressurized thermal shock, and anticipated transients without scram events

The Reactor Coolant System components subject to an aging management review and the component intended functions are provided in Table 3.2-1. The aging management review for the Reactor Coolant Systems is discussed in Section 3.2.

2.3.2 ENGINEERED SAFETY FEATURES SYSTEMS

Engineered Safety Features Systems consist of systems and components 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, the Engineered Safety Features Systems provide emergency coolant to assure 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 Engineered Safety Features Systems for Turkey Point Units 3 and 4 are the same.

The following systems are included in this subsection:

- Emergency Containment Cooling
- Containment Spray
- Containment Isolation
- Safety Injection
- Residual Heat Removal
- Emergency Containment Filtration
- Containment Post Accident Monitoring and Control

2.3.2.1 EMERGENCY CONTAINMENT COOLING

Emergency Containment Cooling is designed to remove sufficient heat to maintain the containment below its structural design pressure and temperature during a loss-of-coolant accident or main steamline break. In addition, the emergency fan cooling units continue to remove heat after the maximum hypothetical accident and reduce containment pressure to atmospheric. Heat removed from the containment is transferred to Component Cooling Water. Emergency Containment Cooling consists of three fan cooling units that are located above the refueling floor, around the inside of each containment. Emergency Containment Cooling is described in UFSAR Section 6.3.

The flow diagrams listed in Table 2.3-4 show the evaluation boundaries for the portions of Emergency Containment Cooling that are within the scope of license renewal.

Emergency Containment Cooling 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

Emergency Containment Cooling components subject to an aging management review include the emergency fan cooler units (pressure boundary only) and associated heat exchanger coils. The intended functions for Emergency Containment Cooling components subject to an aging management review include pressure boundary integrity and heat transfer. A complete list of Emergency Containment Cooling components requiring an aging management review and the component intended functions are provided in Table 3.3-1. The aging management review for Emergency Containment Cooling is discussed in Section 3.3.

2.3.2.2 CONTAINMENT SPRAY

Containment Spray is designed to remove sufficient heat to maintain the containment below its design pressure and temperature during a loss-of-coolant accident or main steam line break. Containment Spray is composed of two motor-driven horizontal centrifugal pumps, each discharging to two spray lateral headers located near the top of the containment structure. The system also utilizes the residual heat removal pumps and heat exchangers for the long-term recirculation phase of containment spray, as described in Subsection 2.3.2.5. Additionally, Containment Spray provides a source of water for Emergency Containment Filtration spray (see Subsection 2.3.2.6). Components associated with this function are included in the scope of Emergency Containment Filtration. Containment Spray is described in UFSAR Section 6.4.

The flow diagrams listed in Table 2.3-4 show the evaluation boundaries for the portions of Containment Spray that are within the scope of license renewal.

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 a part of the Environmental Qualification Program

Containment Spray components subject to an aging management review include the pumps and valves (pressure boundary only), heat exchangers, cyclone separators, piping, tubing, fittings, orifices, and spray nozzles. The intended functions for Containment Spray components subject to an aging management review include pressure boundary integrity, spray, throttling, filtration, and heat transfer. A complete list of Containment Spray components requiring an aging management review and the component intended functions are provided in Table 3.3-2. The aging management review for Containment Spray is discussed in Section 3.3.

2.3.2.3 CONTAINMENT ISOLATION

Containment Isolation is an engineered safety feature that provides for the closure or integrity of containment penetrations to prevent leakage of uncontrolled or unmonitored radioactive materials to the environment. Containment Isolation is described in UFSAR Section 6.6.

Process systems that have license renewal system intended functions in addition to the containment isolation function are included in the system screening results described elsewhere in Section 2.3.

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 described in Section 2.4.

The non-metallic and conductor portions of containment electrical penetrations are included in the electrical screening described in Section 2.5.

Note that all containment penetrations and associated containment isolation valves and components that ensure containment integrity, regardless of where they are described, require an aging management review.

Breathing Air, Nitrogen and Hydrogen, and Containment Purge are the process systems whose only license renewal intended function is containment isolation. The flow diagrams listed in Table 2.3-4 show the evaluation boundaries for the portions of Breathing Air, Nitrogen and Hydrogen, and Containment Purge that are within the scope of license renewal.

Breathing Air, Nitrogen and Hydrogen, and Containment Purge 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 safety-related functions
- SCs that are a part of the Environmental Qualification Program
- SCs that are relied on during station blackout events

Breathing Air, Nitrogen and Hydrogen, and Containment Purge components within the scope of license renewal and subject to aging management review include valves (pressure boundary only), piping, tubing, fittings, and debris screens (Containment Purge). The intended functions for Breathing Air, Nitrogen and Hydrogen, and Containment Purge components subject to an aging management review include pressure boundary integrity and filtration. Breathing Air, Nitrogen and Hydrogen, and Containment Purge components requiring an aging management review and the component intended functions are listed in Table 3.3-3. The aging management review for Containment Isolation is discussed in Section 3.3.

2.3.2.4 SAFETY INJECTION

Safety Injection, which includes the safety injection accumulators, provides emergency core cooling and reactivity control during and following design basis accidents. Safety Injection is described in UFSAR Section 6.2.

The flow diagrams listed in Table 2.3-4 show the evaluation boundaries for the portions of Safety Injection that are within the scope of license renewal. Insulation is not within the scope of license renewal for Safety Injection because the systems do not contain boric acid solutions at concentrations that require heat tracing, tank heaters, and/or insulation to prevent precipitation.

Safety Injection 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 safety-related functions
- SCs that are a part of the Environmental Qualification Program

- SCs that are relied on during certain postulated fire and station blackout events

Safety Injection components subject to an aging management review include the refueling water storage tanks, accumulators, pumps and valves (pressure boundary only), heat exchanger tubes, orifices, piping, tubing, and fittings. The intended functions for Safety Injection components subject to an aging management review include pressure boundary integrity, heat transfer, and throttling. A complete list of Safety Injection components requiring an aging management review and the component intended functions are provided in Table 3.3-4. The aging management review for Safety Injection is discussed in Section 3.3.

2.3.2.5 RESIDUAL HEAT REMOVAL

Residual Heat Removal delivers borated water to the Reactor Coolant Systems during the injection phase of a design basis accident. Following a loss-of-coolant accident, Residual Heat Removal cools and recirculates water that is collected in the containment recirculation sumps and returns it to the Reactor Coolant, Containment Spray, and Safety Injection Systems to maintain reactor core and containment cooling functions. In addition, during normal plant operations, Residual Heat Removal removes residual and sensible heat from the core during plant shutdown, cooldown, and refueling operations. Residual Heat Removal is described in UFSAR Section 6.2.

The flow diagrams listed in Table 2.3-4 show the evaluation boundaries for the portions of Residual Heat Removal that are within the scope of license renewal.

Residual Heat Removal 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 safety-related functions
- SCs that are a part of the Environmental Qualification Program
- SCs that are relied on during certain postulated fire events

Residual Heat Removal components subject to an aging management review include pumps and valves (pressure boundary only), heat exchangers, orifices, piping, tubing, and fittings. The intended functions for Residual Heat Removal

components subject to an aging management review include pressure boundary integrity, heat transfer, and throttling. A complete list of Residual Heat Removal components requiring an aging management review and the component intended functions are provided in Table 3.3-5. The aging management review for Residual Heat Removal is discussed in Section 3.3.

2.3.2.6 EMERGENCY CONTAINMENT FILTRATION

Emergency Containment Filtration serves to reduce the iodine concentration in the containment atmosphere, following a loss-of-coolant accident with failed fuel, to levels ensuring that the offsite dose will not exceed the guidelines of 10 CFR 100 at the site boundary and to assist in limiting the dose to the control room operators to less than 10 CFR 50, Appendix A, General Design Criterion (GDC) 19 limits. Emergency Containment Filtration consists of three filter units, each containing a moisture separator, a high-efficiency particulate filter bank, an impregnated charcoal filter bank, and a fan. Included in the scope of Emergency Containment Filtration are components carrying water from Containment Spray to Emergency Containment Filtration for filter spray. Filter spray provides cooling of the filter in the unlikely event of a post-accident fan trip. Emergency Containment Filtration is described in UFSAR Section 6.3.

The flow diagrams listed in Table 2.3-4 show the evaluation boundaries for the portions of Emergency Containment Filtration that are within the scope of license renewal.

Emergency Containment Filtration 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 safety-related functions
- SCs that are a part of the Environmental Qualification Program

Emergency Containment Filtration components subject to an aging management review include the filter units and valves (pressure boundary only), piping, tubing, fittings, and spray nozzles. The intended functions for Emergency Containment Filtration components subject to an aging management review include pressure boundary integrity and spray. A complete list of Emergency Containment Filtration

components requiring an aging management review and the component intended functions are provided in Table 3.3-6. The aging management review for Emergency Containment Filtration is discussed in Section 3.3.

2.3.2.7 CONTAINMENT POST ACCIDENT MONITORING AND CONTROL

Containment Post Accident Monitoring and Control includes the following subsystems:

- Post Accident Hydrogen Monitoring
- Containment Pressure Monitoring
- Post Accident Sampling
- Post Accident Hydrogen Control
- Containment Air Particulate and Gas Monitoring

This subsection addresses the mechanical SCs that are required to support the system intended functions of these subsystems. The screening results for electrical/I&C SCs are provided in Section 2.5 of this Application. Two subsystems of the Containment Post Accident Monitoring and Control System, Containment Water Level Monitoring and Containment High Range Radiation Monitoring, do not contain mechanical SCs required to support the intended functions of these subsystems. Therefore, SCs associated with the Containment Water Level Monitoring and Containment High Range Radiation Monitoring subsystems are addressed in Section 2.5.

The flow diagrams listed in Table 2.3-4 show the evaluation boundaries for the portions of the Containment Post Accident Monitoring and Control System that are within the scope of license renewal.

Post accident hydrogen monitoring provides indication of the hydrogen gas concentration in the containment atmosphere following a loss-of-coolant accident. The mechanical portions of post accident hydrogen monitoring provide a flow path from the containment to the hydrogen monitors and then back to containment. Post accident hydrogen monitoring is described in UFSAR Section 9.14.

Containment pressure monitoring consists of redundant containment pressure signals that are provided to isolate the containment and initiate several reactor safeguard actions. The mechanical portions of containment pressure monitoring

provide sensing lines from the containment to the containment pressure monitors. Containment pressure monitoring is described in UFSAR Section 7.5.

The only mechanical portion of post accident sampling in the scope of license renewal is the sample cooler because it forms a part of the Component Cooling Water pressure boundary. Component Cooling Water is described in UFSAR Section 9.3.

Post accident hydrogen control provides the means for achieving and maintaining containment post accident hydrogen control. Post accident hydrogen control is described in UFSAR Section 9.12.

Containment air particulate and gas monitoring measures radioactivity in the containment air. The mechanical portions of containment air particulate and gas monitoring provide a flow path from the containment to the monitors and then back to the containment. Containment air particulate and gas monitoring is described in UFSAR Section 11.2.3.

Containment Post Accident Monitoring and Control 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 safety-related functions
- SCs that are a part of the Environmental Qualification Program
- SCs that are relied on during station blackout

Containment Post Accident Monitoring and Control components subject to an aging management review include pumps and valves (pressure boundary only), orifices, piping, tubing, and fittings. The intended functions for Containment Post Accident Monitoring and Control components subject to an aging management review include pressure boundary integrity and throttling. A complete list of Containment Post Accident Monitoring and Control components requiring an aging management review and the component intended functions are provided in Table 3.3-7. The aging management review for Containment Post Accident Monitoring and Control is discussed in Section 3.3.

2.3.3 AUXILIARY SYSTEMS

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 Turkey Point Units 3 and 4 are the same. The following systems are included in this subsection:

- Intake Cooling Water
- Component Cooling Water
- Spent Fuel Pool Cooling
- Chemical and Volume Control
- Primary Water Makeup
- Sample Systems
- Waste Disposal
- Instrument Air
- Normal Containment And Control Rod Drive Mechanism Cooling
- Auxiliary Building Ventilation
- Control Building Ventilation
- Emergency Diesel Generator Building Ventilation
- Turbine Building Ventilation
- Fire Protection
- Emergency Diesel Generators and Support Systems

2.3.3.1 INTAKE COOLING WATER

Intake Cooling Water removes heat from Component Cooling Water and Turbine Plant Cooling Water. The Intake Cooling Water pumps supply salt water from the plant's intake area through two redundant piping headers to the tube side of the Component Cooling Water and Turbine Plant Cooling Water heat exchangers. Flow is routed from the heat exchangers to the plant discharge canal. Intake Cooling Water is described in UFSAR Section 9.6.2.

The flow diagrams listed in Table 2.3-5 show the evaluation boundaries for the portions of Intake Cooling Water that are within the scope of license renewal. Note: The Component Cooling Water heat exchangers were considered to be part of Component Cooling Water and were screened with that system. (See Subsection 2.3.3.2.)

Intake Cooling Water 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 safety-related functions
- SCs that are relied on during postulated fires and station blackout events

Intake Cooling Water components subject to an aging management review include: pumps and valves (pressure boundary only), strainers, orifices, piping, tubing, and fittings. The intended functions for Intake Cooling Water components subject to an aging management review are pressure boundary integrity, filtration, structural integrity, structural support, and throttling. For a complete list of Intake Cooling Water components that require aging management review and the component intended functions, see Table 3.4-1. The aging management review for Intake Cooling Water is discussed in Section 3.4.

2.3.3.2 COMPONENT COOLING WATER

Component Cooling Water removes heat from safety-related and non-safety related components during normal and emergency operation. 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. Component Cooling Water is described in UFSAR Section 9.3.

The flow diagrams listed in Table 2.3-5 show the evaluation boundaries for the portions of Component Cooling Water that are within the scope of license renewal. Note: Other coolers and heat exchangers cooled by Component Cooling Water were considered part of their respective systems. Accordingly, these coolers and heat exchangers were screened with those systems.

Component Cooling Water 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 safety-related functions
- SCs that are part of the Environmental Qualification Program
- SCs that are relied on during postulated fires and station blackout events

Component Cooling Water components subject to an aging management review include: pumps and valves (pressure boundary only), heat exchangers, tanks, orifices, piping, tubing, and fittings. The intended functions for Component Cooling Water components subject to an aging management review include pressure boundary integrity, heat transfer, and throttling. For a complete list of Component Cooling Water components that require aging management review and the component intended functions, see Table 3.4-2. The aging management review for Component Cooling Water is discussed in Section 3.4.

2.3.3.3 SPENT FUEL POOL COOLING

Spent Fuel Pool Cooling removes decay heat from the spent fuel pool and filters and demineralizes the water in the spent fuel pool. There are two spent fuel pools and Spent Fuel Pool Cooling Systems. Spent Fuel Pool Cooling consists of three separate loops: cooling, purification, and skimmer loops.

The cooling loop removes heat from the spent fuel pool by circulating water through the spent fuel pool heat exchanger. The heat from the spent fuel pool is transferred to Component Cooling Water. The purification loop filters and demineralizes the spent fuel pool water by circulating a portion of the cooling loop flow through a filter and demineralizer. The skimmer loop removes dust and debris from the water surface of the spent fuel pool by taking a suction on the skimmer and circulating the water through strainers and filters. Spent Fuel Pool Cooling is described in UFSAR Section 9.3 and Appendix 14D.

The flow diagrams listed in Table 2.3-5 show the evaluation boundaries for the portions of Spent Fuel Pool Cooling that are within the scope of license renewal.

Spent Fuel Pool Cooling 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 safety-related functions
- SCs that are relied on during station blackout events

Spent Fuel Pool Cooling components subject to an aging management review include: pumps and valves (pressure boundary only), heat exchangers, filters, demineralizers, orifices, piping, tubing, and fittings. The intended functions for Spent Fuel Pool Cooling components subject to an aging management review include pressure boundary integrity, heat transfer, and throttling. For a complete list of Spent Fuel Pool Cooling components that require aging management review and the component intended functions, see Table 3.4-3. The aging management review for Spent Fuel Pool Cooling is discussed in Section 3.4.

2.3.3.4 CHEMICAL AND VOLUME CONTROL

Chemical and Volume Control provides a continuous feed and bleed for the Reactor Coolant System to maintain proper water level and to adjust boron concentration. Chemical and Volume Control includes Boron Addition and Supply, which provides makeup, transfers boric acid solution, and maintains reactor water purity. Some components of Boron Addition and Supply are common to Turkey Point Units 3 and 4. Chemical and Volume Control is described in UFSAR Section 9.2.

The flow diagrams listed in Table 2.3-5 show the evaluation boundaries for the portions of Chemical and Volume Control that are within the scope of license renewal. Insulation is not within the scope of license renewal for Chemical and Volume Control because the systems do not contain boric acid solutions at concentrations that require heat tracing, tank heaters, and/or insulation to prevent precipitation.

Chemical and Volume Control 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 safety-related functions

- SCs that are part of the Environmental Qualification Program
- SCs that are relied on during postulated fires and station blackout events

Chemical and Volume Control components subject to an aging management review include: pumps and valves (pressure boundary only), tanks, heat exchangers, orifices, piping, tubing, and fittings. The intended functions for Chemical and Volume Control components subject to an aging management review include pressure boundary integrity, heat transfer, and throttling. For a complete list of Chemical and Volume Control components that require aging management review and the component intended functions, see Table 3.4-4. The aging management review for Chemical and Volume Control is discussed in Section 3.4.

2.3.3.5 PRIMARY WATER MAKEUP

Primary Water Makeup provides demineralized and deaerated water for makeup to various systems throughout the plant. The Turkey Point Units 3 and 4 Primary Water Makeup Systems are operated independently, however, the systems can be cross-connected. Primary Water Makeup is described in UFSAR Section 9.6.2.

The flow diagrams listed in Table 2.3-5 show the evaluation boundaries for the portions of Primary Water Makeup that are within the scope of license renewal.

Primary Water Makeup 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 safety-related functions
- SCs that are relied on during postulated fires and station blackout events

Primary Water Makeup components subject to an aging management review include: valves (pressure boundary only), piping, tubing, and fittings. The intended function for Primary Water Makeup components subject to an aging management review is pressure boundary integrity. For a complete list of Primary Water Makeup components that require aging management review and the component intended functions, see Table 3.4-5. The aging management review for Primary Water Makeup is discussed in Section 3.4.

2.3.3.6 SAMPLE SYSTEMS

Turkey Point Units 3 and 4 Sample Systems each consist of two subsystems: Sample System - Nuclear Steam Supply System and Sample System - Secondary. Both subsystems are designed to operate manually, on an intermittent basis. Samples can be obtained under conditions ranging from full power to cold shutdown.

The Sample System - Nuclear Steam Supply System permits remote sampling of fluids of the primary plant systems. The subsystem is used to evaluate fluid chemistry in the Reactor Coolant, Emergency Core Cooling, and Chemical and Volume Control Systems. The Sample System - Nuclear Steam Supply System is described in UFSAR Section 9.4.

The Sample System - Secondary permits remote sampling of fluids of the secondary systems. The subsystem is used to evaluate fluid chemistry in the Feedwater, Condensate/Condenser Hotwell, Steam Generator Blowdown, Main Steam, and Heater Drain Systems. A description of the Sample System – Secondary is not included in the UFSAR.

The flow diagrams listed in Table 2.3-5 show the evaluation boundaries for the portions of the Sample Systems that are within the scope of license renewal.

Sample 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 safety-related functions
- SCs that are part of the Environmental Qualification Program
- SCs that are relied on during postulated fires, anticipated transients without scram and station blackout events

Sample Systems components subject to an aging management review include: valves and coolers (pressure boundary only), piping, tubing, and fittings. The intended functions for Sample Systems components subject to an aging management review include pressure boundary integrity and throttling. For a complete list of Sample Systems components that require aging management review and the component intended functions, see Table 3.4-6. The aging management review for Sample Systems is discussed in Section 3.4.

2.3.3.7 WASTE DISPOSAL

Waste Disposal collects and processes potentially radioactive reactor plant wastes prior to release or removal from the plant site. The system is common to Units 3 and 4 except for the components associated with each containment. Waste Disposal consists of three subsystems: liquid; solid; and gaseous waste disposal systems. Waste Disposal is described in UFSAR Section 11.1.

The flow diagrams listed in Table 2.3-5 show the evaluation boundaries for the portions of Waste Disposal that are within the scope of license renewal.

Waste Disposal 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 safety-related functions
- SCs that are part of the Environmental Qualification Program
- SCs that are relied on during postulated fires and station blackout events

Waste Disposal components subject to an aging management review include: pumps, valves and heat exchangers (pressure boundary only), piping, tubing, and fittings. The intended function for Waste Disposal components subject to an aging management review is pressure boundary integrity. For a complete list of Waste Disposal components that require aging management review and the component intended functions, see Table 3.4-7. The aging management review for Waste Disposal is discussed in Section 3.4.

2.3.3.8 INSTRUMENT AIR

Instrument Air provides a reliable source of dry, oil-free air for instrumentation and controls and pneumatic valves. Instrument Air provides motive power and control air to safety-related and non-safety related components. Instrument Air contains both electric driven and diesel driven air compressors. Instrument Air is described in UFSAR Section 9.17.

Safety-related air operated valves, normally supplied by Instrument Air, which are required to operate following design basis events are provided with backup sources

of either air or nitrogen. These backup sources are considered safety related and were screened with the particular valves they serve.

The flow diagrams listed in Table 2.3-5 show the evaluation boundaries for the portions of Instrument Air that are within the scope of license renewal. Note that some of the license renewal boundaries have been established at normally open valves. This approach is considered acceptable for Instrument Air for the following reasons:

- 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:

- 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 safety-related functions
- SCs that are part of the Environmental Qualification Program
- SCs that are relied on during postulated fires and station blackout events

Instrument Air components subject to an aging management review include: valves (pressure boundary only), flasks/tanks, filters, strainers, heat exchangers, orifices, piping, tubing, and fittings. The intended functions for Instrument Air components subject to an aging management review include pressure boundary integrity, heat transfer, filtration, and throttling. For a complete list of Instrument Air components that require aging management review and the component intended functions, see Table 3.4-8. The aging management review for Instrument Air is discussed in Section 3.4.

2.3.3.9 NORMAL CONTAINMENT AND CONTROL ROD DRIVE MECHANISM COOLING

Normal Containment and Control Rod Drive Mechanism Cooling provides air circulation and cooling to maintain containment bulk ambient temperature below design limits and to remove heat from the Control Rod Drive Mechanisms.

Normal Containment and Control Rod Drive Mechanism Cooling is described in UFSAR Section 9.10.

The flow diagrams listed in Table 2.3-5 show the evaluation boundaries for the portions of Normal Containment and Control Rod Drive Mechanism Cooling that are within the scope of license renewal.

Normal Containment and Control Rod Drive Mechanism Cooling is in the scope of license renewal because it contains:

- SCs that are non-safety related whose failure could prevent satisfactory accomplishment of the safety-related functions
- SCs that are relied on during postulated fires and station blackout events

Normal Containment and Control Rod Drive Mechanism Cooling components subject to an aging management review include: heat exchangers, coolers, ductwork, tubing, and fittings. The intended functions for Normal Containment and Control Rod Drive Mechanism Cooling components subject to an aging management review include pressure boundary integrity, heat transfer, and structural support. For a complete list of Normal Containment and Control Rod Drive Mechanism Cooling components that require aging management review and the component intended functions, see Table 3.4-9. The aging management review for Normal Containment and Control Rod Drive Mechanism Cooling is discussed in Section 3.4.

2.3.3.10 AUXILIARY BUILDING VENTILATION

Auxiliary Building Ventilation provides adequate heat removal to ensure proper operation of safety-related equipment in the auxiliary building. Auxiliary Building Ventilation includes Electrical Equipment Room Ventilation.

Auxiliary Building Ventilation is common to both units. The system provides clean air to the operating areas of the auxiliary building and exhausts air from the

equipment rooms and open areas of the auxiliary building. Auxiliary Building Ventilation is described in UFSAR Section 9.8.1.

Electrical Equipment Room Ventilation is the same for Turkey Point Units 3 and 4. Electrical Equipment Room Ventilation provides cooling for the electrical equipment room under normal and emergency conditions. During normal operations, non-safety related chillers maintain the desired room temperature. In the event of a failure of the non-safety related system or a loss of offsite power, safety-related air conditioners will perform the same function. Electrical Equipment Room Ventilation is described in UFSAR Section 9.8.2.

The flow diagrams listed in Table 2.3-5 show the evaluation boundaries for the portions of Auxiliary Building Ventilation and Electrical Equipment Room Ventilation that are within the scope of license renewal.

Auxiliary Building Ventilation and Electrical Equipment Room Ventilation 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 safety-related functions
- SCs that are relied on during postulated fires and station blackout events

Auxiliary Building Ventilation and Electrical Equipment Room Ventilation components subject to an aging management review include: air handlers (pressure boundary only), filters, ductwork, tubing, and fittings. The intended function for Auxiliary Building Ventilation and Electrical Equipment Room Ventilation components subject to an aging management review is pressure boundary integrity. For a complete list of Auxiliary Building Ventilation and Electrical Equipment Room Ventilation components that require aging management review and the component intended functions, see Table 3.4-10. The aging management review for Auxiliary Building Ventilation and Electrical Equipment Room Ventilation is discussed in Section 3.4.

2.3.3.11 CONTROL BUILDING VENTILATION

Control Building Ventilation provides a temperature controlled environment to ensure proper operation of equipment in the control building. Control Building Ventilation is

composed of three subsystems: Control Room Ventilation; Computer/Cable Spreading Room Ventilation; and DC Equipment/Inverter Room Ventilation. These subsystems are common for Turkey Point Units 3 and 4.

Control Room Ventilation circulates air from the control room and the control room offices through roughing filters to the air handling units. Conditioned air is returned and distributed throughout the control room. Control Room Ventilation maintains the habitability of the control room following design basis events. Control Room Ventilation is described in UFSAR Section 9.9.1.

Computer/Cable Spreading Room Ventilation maintains the temperature and humidity requirements of the vital electrical equipment installed in the computer and cable spreading rooms. It also provides sufficient ventilation for intermittent occupancy by operations and maintenance personnel. Computer/Cable Spreading Room Ventilation is described in UFSAR Section 9.9.3.

DC Equipment/Inverter Room Ventilation provides cooling to the rooms that house the safety-related battery banks, battery chargers, inverters, and DC load centers. DC Equipment/Inverter Room Ventilation is described in UFSAR Section 9.9.2.

The flow diagrams listed in Table 2.3-5 show the evaluation boundaries for the portions of Control Building Ventilation that are within the scope of license renewal.

Control Building Ventilation 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 safety-related functions
- SCs that are relied on during postulated fires and station blackout events

Control Building Ventilation components subject to an aging management review include: air handling units and valves (pressure boundary only), heat exchangers, ductwork, piping, tubing, and fittings. The intended functions for Control Building Ventilation components subject to an aging management review include pressure boundary integrity, throttling, and heat transfer. For a complete list of Control Building Ventilation components that require aging management review and the component intended functions, see Table 3.4-11. The aging management review for Control Building Ventilation is discussed in Section 3.4.

2.3.3.12 EMERGENCY DIESEL GENERATOR BUILDING VENTILATION

Emergency Diesel Generator Building Ventilation is required to provide cooling functions for the emergency diesel generators and associated equipment. Emergency Diesel Generator Building Ventilation is different for Turkey Point Units 3 and 4. Emergency Diesel Generator Building Ventilation is necessary to ensure proper operation of the emergency diesel generators and other safety-related electrical equipment.

Unit 3 Emergency Diesel Generator Building Ventilation consists of one wall mounted exhaust fan and associated ductwork for each emergency diesel generator. The fan operates to maintain cooling in the room when its associated emergency diesel generator is running.

Unit 4 Emergency Diesel Generator Building Ventilation includes the following subsystems: Emergency Diesel Generator Room Ventilation; Diesel Control Room Ventilation; and 3D and 4D Switchgear Room Ventilation. Unit 4 Emergency Diesel Generator Building Ventilation is described in UFSAR Section 8.2.2.1.1.3.

The flow diagrams listed in Table 2.3-5 show the evaluation boundaries for the portions of Emergency Diesel Generator Building Ventilation that are within the scope of license renewal. Note: There is no flow diagram for Unit 3 Emergency Diesel Generator Building Ventilation, however, all components associated with this system are in the scope of license renewal.

Emergency Diesel Generator Building Ventilation 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 safety-related functions
- SCs that are relied on during postulated fires, anticipated transients without scram, and station blackout events

Emergency Diesel Generator Building Ventilation components subject to an aging management review include: filters (pressure boundary only), ductwork, tubing, and fittings. The intended function for Emergency Diesel Generator Building Ventilation components subject to an aging management review is pressure boundary integrity.

For a complete list of Emergency Diesel Generator Building Ventilation components that require aging management review and the component intended functions, see Table 3.4-12. The aging management review for Emergency Diesel Generator Building Ventilation is discussed in Section 3.4.

2.3.3.13 TURBINE BUILDING VENTILATION

Turbine Building Ventilation provides a temperature controlled environment to ensure proper operation of equipment in the turbine building. Turbine Building Ventilation consists of two subsystems: Load Center and Switchgear Rooms Ventilation; and Steam Generator Feed Pump Ventilation.

Load Center and Switchgear Rooms Ventilation provides a temperature controlled environment for the safety-related 4160V switchgear and 480V load centers, located in the rooms, during normal and emergency conditions. Load Center and Switchgear Rooms Ventilation is described in UFSAR Section 9.16.

Steam Generator Feed Pump Ventilation provides cooling to the steam generator feed pump room. The subsystem is non-safety related, performs no safety-related functions, and is not in the scope of license renewal.

The flow diagrams listed in Table 2.3-5 show the evaluation boundaries for the portions of Turbine Building Ventilation that are within the scope of license renewal.

Turbine Building Ventilation is in the scope of license renewal because it contains:

- SCs that are non-safety related whose failure could prevent satisfactory accomplishment of the safety-related functions
- SCs that are relied on during postulated fires and station blackout events

Turbine Building Ventilation components subject to an aging management review include: pumps, valves, and air handling units (pressure boundary only); heat exchangers, piping, tubing, and fittings. The intended functions for Turbine Building Ventilation components subject to an aging management review include pressure boundary integrity, throttling, and heat transfer. For a complete list of Turbine Building Ventilation components that require aging management review and the component intended functions, see Table 3.4-13. The aging management review for Turbine Building Ventilation is discussed in Section 3.4.

2.3.3.14 FIRE PROTECTION

Fire Protection protects plant equipment in the event of a fire, to ensure safe plant shutdown, and minimizes the risk of a radioactive release to the environment. Fire Protection consists of Fire Water Supply including sprinklers, Halon Suppression, Fire Dampers, RCP Oil Collection, Alternate Shutdown, Safe Shutdown, and Fire Detection and Protection. Individual components that constitute Alternate Shutdown and Safe Shutdown were screened with their respective systems. Fire Detection and Protection was screened with Electrical and Instrumentation and Controls (See Section 2.5). Fire Protection is described in UFSAR Appendix 9.6A. The majority of Fire Protection is common to Units 3 and 4.

The flow diagrams listed in Table 2.3-5 show the evaluation boundaries for the portions of Fire Protection that are within the scope of license renewal.

Fire Protection 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 safety-related functions
- SCs that are relied on during postulated fires

Fire Protection components subject to an aging management review include the raw water tanks, pumps and valves (pressure boundary only), tanks, heat exchangers, hose stations, flame arrestors, sprinklers, strainers, orifices, piping, tubing, and fittings. The intended functions for Fire Protection components subject to an aging management review are pressure boundary integrity, heat transfer, filtration, throttling, fire spread prevention, and spray. For a complete list of the Fire Protection components that require aging management review and the component intended functions, see Tables 3.4-14 and 3.6-12. The aging management reviews for Fire Protection are discussed in Section 3.4 and Subsection 3.6.2. Fire extinguishers, fire hoses, and air packs are not subject to an aging management review because they are replaced based on condition in accordance with National Fire Protection Association (NFPA) standards and plant surveillance procedures for fire protection equipment. This position is consistent with the NRC Staff's guidance on consumables provided in the NRC's March 10, 2000, letter from Christopher I. Grimes to Douglas J. Walters [Reference 2.3-12].

2.3.3.15 EMERGENCY DIESEL GENERATORS AND SUPPORT SYSTEMS

The Emergency Diesel Generators provide AC power to the onsite electrical distribution system to assure the capability for a safe and orderly shutdown. The Emergency Diesel Generators Support Systems necessary to ensure proper operation of the Emergency Diesel Generators are:

- Air Intake and Exhaust
- Air Start
- Fuel Oil
- Cooling Water
- Lube Oil

The Emergency Diesel Generators are described in UFSAR Section 8.2.2.1.1.1 and the Emergency Diesel Generators Support Systems are described in Section 9.15.

The Unit 3 emergency diesel generator fuel oil storage tank is a free-standing steel tank. The Unit 4 emergency diesel generator fuel oil storage tank is a concrete structure with a steel liner that is an integral part of the Unit 4 emergency diesel generator building.

The flow diagrams listed in Table 2.3-5 show the evaluation boundaries for the portions of Emergency Diesel Generators and Support Systems that are within the scope of license renewal.

Emergency Diesel Generators and Support 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 safety-related functions
- SCs that are relied on during postulated fires, anticipated transients without scram, and station blackout events

Emergency Diesel Generators and Support Systems components subject to an aging management review include: two Diesel Oil Storage Tanks, pumps and valves (pressure boundary only), tanks, heat exchangers, flame arrestors, filters, strainers,

piping, tubing, and fittings. The intended functions for Emergency Diesel Generators and Support Systems components subject to an aging management review include pressure boundary integrity, filtration, heat transfer, throttling, and fire spread prevention. For a complete list of the Emergency Diesel Generators and Support Systems components that require aging management review and component intended functions, see Table 3.4-15. The aging management review for the Emergency Diesel Generators and Support Systems are discussed in Section 3.4.

2.3.4 STEAM AND POWER CONVERSION SYSTEMS

The Steam and Power Conversion Systems act as a heat sink to remove heat from the reactor and convert the heat generated in the reactor to the plant's electrical output. Unless noted otherwise, the Steam and Power Conversion Systems for Turkey Point Units 3 and 4 are the same. The following systems are included in this subsection:

- Main Steam and Turbine Generators
- Feedwater and Blowdown
- Auxiliary Feedwater and Condensate Storage

2.3.4.1 MAIN STEAM AND TURBINE GENERATORS

Main Steam transports saturated steam from the steam generators to the main turbine and other secondary steam system components. Main Steam provides the principal heat sink for the Reactor Coolant System protecting the Reactor Coolant System and the steam generators from overpressurization, provides isolation of the steam generators during a postulated steam line break, and provides steam supply to the Auxiliary Feedwater pump turbines.

Turbine Generators convert the steam input from Main Steam to the plant's electrical output, provide first-stage pressure input to the reactor protection system, and provide isolation under certain postulated steam line break scenarios. Main Steam and Turbine Generators are described in UFSAR Section 10.2.2.

The flow diagrams listed in Table 2.3-6 show the evaluation boundaries for the mechanical portions of Main Steam and Turbine Generators that are within the scope of license renewal.

Main Steam 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 safety-related functions
- SCs that are part of the Environmental Qualification Program

- SCs that are relied on during postulated fires, anticipated transients without scram, and station blackout events

Turbine Generators are in the scope of license renewal because they contain:

- SCs that are non-safety related whose failure could prevent satisfactory accomplishment of the safety-related functions
- SCs that are relied on during anticipated transients without scram events

Main Steam and Turbine Generators components subject to an aging management review include: valves (pressure boundary only), steam traps, flow elements, piping, tubing, and fittings. The intended functions for Main Steam and Turbine Generators components subject to an aging management review are pressure boundary integrity and throttling. For a complete list of Main Steam and Turbine Generators components that require aging management review and the component intended functions, see Table 3.5-1. The aging management review for Main Steam and Turbine Generators is discussed in Section 3.5.

2.3.4.2 FEEDWATER AND BLOWDOWN

Feedwater and Blowdown provide sufficient water flow to the steam generators to maintain an adequate heat sink for the Reactor Coolant System, provide for feedwater and blowdown isolation following a postulated loss-of-coolant accident or steam line break event, and assist in maintaining steam generator water chemistry. Feedwater and Blowdown consists of three subsystems: Main Feedwater; Steam Generator Blowdown; and Standby Steam Generator Feedwater.

Main Feedwater supplies pre-heated, high-pressure feedwater to the steam generators at a rate equal to main steam and the steam generator blowdown flows. The feedwater flow rate is controlled by the Steam Generator Level Control System which determines the desired feedwater flow by comparing the feed flow, steam flow, and steam generator level. Main Feedwater is described in UFSAR Section 10.2.2.

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 fed by three independent blowdown lines (one per steam generator), which tie to a common blowdown flask. Steam generator blowdown is continuously monitored for

radioactivity during plant operation. Steam Generator Blowdown is described in UFSAR Section 10.2.4.3.

Standby Steam Generator Feedwater is common to Turkey Point Units 3 and 4. Standby Steam Generator Feedwater supplies steam generator feedwater during normal startup, shutdown, and hot standby conditions. Standby Steam Generator Feedwater delivers sufficient feedwater to maintain one unit at hot standby while providing makeup for maximum blowdown. The Standby Steam Generator Feedwater pumps take suction from the demineralized water storage tank and discharge to a common header upstream of the feedwater regulating valves. Standby Steam Generator Feedwater is described in UFSAR Section 9.11.

The flow diagrams listed in Table 2.3-6 show the evaluation boundaries for the portions of Feedwater and Blowdown that are within the scope of license renewal.

Main Feedwater 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 safety-related functions
- SCs that are relied on during postulated fires, anticipated transients without scram, and station blackout events

Steam Generator Blowdown 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 safety-related functions
- SCs that are part of the Environmental Qualification Program
- SCs that are relied on during postulated fires, anticipated transients without scram, and station blackout events

Standby Steam Generator Feedwater is in the scope of license renewal because it contains:

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

- SCs that are relied on during postulated fires

Feedwater and Blowdown components subject to an aging management review include the Demineralized Water Storage Tank, pumps and valves (pressure boundary only), orifices, piping, tubing, and fittings. The intended functions for the Feedwater and Blowdown components subject to an aging management review are pressure boundary integrity and throttling. For a complete list of Feedwater and Blowdown components that require aging management review and the component intended functions, see Table 3.5-2. The aging management review for Feedwater and Blowdown is discussed in Section 3.5.

2.3.4.3 AUXILIARY FEEDWATER AND CONDENSATE STORAGE

Auxiliary Feedwater supplies feedwater to the steam generators when normal feedwater sources are not available, provides for auxiliary feedwater steam and feedwater isolation during a postulated steam generator tube rupture event, and provides for auxiliary feedwater isolation to the faulted steam generator and limits feedwater flow to the steam generators to limit positive reactivity insertion during a postulated steam line break event. Auxiliary Feedwater is a shared system between Turkey Point Units 3 and 4.

Auxiliary Feedwater contains three steam turbine driven pumps. The pumps can be supplied steam from the steam generators in either unit. The pumps take suction from either condensate storage tank and discharge to one of two redundant headers. Each header can supply each steam generator. Auxiliary Feedwater is normally maintained in standby with one pump aligned to one discharge header and two pumps aligned to the other header. Upon initiation, all three pumps start to supply the affected steam generator with feedwater. Auxiliary Feedwater is described in UFSAR Section 9.11.

Condensate Storage stores water for use by Auxiliary Feedwater to support safe shutdown of the plant. Condensate Storage consists of a condensate storage tank on each unit with piping that feeds all three auxiliary feedwater pumps. The tank outlet piping is cross-connected between the units so that either tank can supply the water required by Auxiliary Feedwater. Condensate Storage is described in UFSAR Section 9.11.3.

The flow diagrams listed in Table 2.3-6 show the evaluation boundaries for the portions of Auxiliary Feedwater and Condensate Storage that are within the scope of license renewal.

Auxiliary Feedwater 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 safety-related functions
- SCs that are part of the Environmental Qualification Program
- SCs that are relied on during postulated fires, anticipated transients without scram, and station blackout events

Condensate Storage 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 relied on during postulated fires, anticipated transients without scram, and station blackout events

Auxiliary Feedwater and Condensate Storage components subject to an aging management review include: Condensate Storage Tanks, pumps and valves (pressure boundary only), coolers, orifices, piping, tubing, and fittings. The intended functions for Auxiliary Feedwater and Condensate Storage components subject to an aging management review are pressure boundary integrity, heat transfer, and throttling. For a complete list of Auxiliary Feedwater and Condensate Storage components that require aging management review and the component intended functions, see Table 3.5-3. The aging management review for Auxiliary Feedwater and Condensate Storage is discussed in Section 3.5.

2.3.5 REFERENCES

2.3-1 WCAP-14575, "License Renewal Evaluation: Aging Management Evaluation for Class 1 Piping and Associated Pressure Boundary Components," Revision 1, August 1996.

2.3-2 R. A. Newton (WOG) letter to U. S. Nuclear Regulatory Commission, "Response to NRC Request (dated April 18, 1997) for Additional Information on WOG Generic Technical Report WCAP-14575, License Renewal Evaluation: Aging Management Evaluation for Class 1 Piping and Associated Pressure Boundary Components," June 13, 1997.

2.3-3 R. A. Newton (WOG) letter to U. S. Nuclear Regulatory Commission, "Response to NRC Request (dated June 4, 1999) for Additional Information on WOG Generic Technical Reports WCAP-14574, Aging Management Evaluation for Pressurizers, and WCAP-14575, Aging Management Evaluation for Class 1 Piping and Associated Pressure Boundary Components," July 19, 1999.

2.3-4 C. I. Grimes (NRC) letter to R. A. Newton (WOG), "Draft Safety Evaluation Concerning Westinghouse Owners Group License Renewal Evaluation: Aging Management Evaluation for Class 1 Piping and Associated Pressure Boundary Components, WCAP-14575, Revision 1, August 1996," February 10, 2000.

2.3-5 WCAP-14574, "License Renewal Evaluation: Aging Management Evaluation for Pressurizers," Revision 0, July 1996.

2.3-6 R. A. Newton (WOG) letter to U. S. Nuclear Regulatory Commission, "Response to NRC Request (dated May 6, 1997) for Additional Information on WOG Generic Technical Report WCAP-14574, License Renewal Evaluation: Aging Management for Pressurizers," May 30, 1997.

2.3-7 C. I. Grimes (NRC) letter to R. A. Newton (WOG), "Draft Safety Evaluation Concerning the Westinghouse Owners Group License Renewal Evaluation: Aging Management Evaluation for Pressurizers, WCAP-14574, Revision 0, July 1996," August 7, 2000.

2.3-8 WCAP-14577, "License Renewal Evaluation: Aging Management for Reactor Internals," Revision 0, June 1997.

2.3-9 R. A. Newton (WOG) letter to U. S. Nuclear Regulatory Commission, "Response to NRC Request (dated June 14, 1999) for Additional Information on WOG Generic Technical Reports: WCAP-14577, License Renewal Evaluation: Aging Management for Reactor Vessel Internals," November 24, 1999.

2.3-10 WCAP-14422, "License Renewal Evaluation: Aging Management for Reactor Coolant System Supports," Revision 2, March 1997.

2.3-11 C. I. Grimes (NRC) to letter R. A. Newton (WOG), "Draft Safety Evaluation Concerning the Westinghouse Owners Group License Renewal Evaluation: Aging Management for Reactor Coolant System Supports, WCAP-14422, Revision 2," February 25, 2000.

2.3-12 Christopher I. Grimes (NRC) letter to Douglas J. Walters (NEI), "License Renewal Issue No. 98-12, Consumables," March 10, 2000.

2.3-13 Richard P. Croteau (NRC) letter to J. H. Goldberg (FPL), "Turkey Point Units 3 and 4 - Approval to Utilize Leak-Before-Break Methodology for Reactor Coolant System Piping," June 23, 1995.

2.3-14 FPL letter L-2000-176 to U. S. Nuclear Regulatory Commission, "License Renewal Boundary Drawings."

TABLE 2.3-1
REACTOR COOLANT SYSTEM
EVALUATION BOUNDARIES[1]

Drawing Number	Revision
Reactor Coolant	
3-RCS-01	0
3-RCS-02	0
3-RCS-03	0
3-RCS-04	0
4-RCS-01	0
4-RCS-02	0
4-RCS-03	0
4-RCS-04	0
Safety Injection	
3-SI-01	0
3-SI-03	0
4-SI-01	0
4-SI-03	0
Residual Heat Removal	
3-RHR-01	0
4-RHR-01	0
Sample System – Nuclear Steam Supply System	
3-SAMP-03	0
4-SAMP-03	0
Chemical and Volume Control	
3-CVCS-02	0
3-CVCS-03	0
4-CVCS-02	0
4-CVCS-03	0

NOTE: 1. Drawings submitted separately [Reference 2.3-14].

TABLE 2.3-2
CLASS 1 PIPING AND ASSOCIATED PRESSURE BOUNDARY COMPONENTS - APPLICANT ACTION ITEMS FROM SECTION 4.1 OF WCAP-14575 DRAFT SAFETY EVALUATION

Renewal Applicant Action Item	Turkey Point-Specific Response
(1) The license renewal applicant is to verify that its plant is bounded by the technical report. Further, the renewal applicant is to commit to programs described as necessary in the technical report to manage the effects of aging during the period of extended operation on the functionality of the reactor coolant system piping. Applicants for license renewal will be responsible for describing any such commitments and identifying how such commitments will be controlled. Any deviations from the aging management programs within this technical report described as necessary to manage the effects of aging during the period of extended operation and to maintain the functionality of the reactor coolant system piping and associated pressure boundary components or other information presented in the report, such as materials of construction, will have to be identified by the renewal applicant and evaluated on a plant-specific basis in accordance with 10 CFR 54.21(a)(3) and (c)(1).	As summarized in Subsections 2.3.1.2 and 2.3.1.7, the Turkey Point Class 1 piping and reactor coolant pumps are bounded by the topical report with regard to design criteria and features, materials of construction, fabrication techniques, installed configuration, modes of operation and environments/exposures. Programs necessary to manage the effects of aging are described in Subsections 3.2.1 and 3.2.6 and are summarized in Table 3.2-1. Program commitments to manage the effects of aging for Class 1 piping and reactor coolant pumps are described in Appendix B and are summarized in the proposed UFSAR supplement provided in Appendix A. Deviations from the aging management programs included in the topical report are described in Subsections 3.2.1 and 3.2.6.
(2) Summary description of the programs and evaluation of Time-Limited Aging Analyses are to be provided in the license renewal FSAR supplement in accordance with 10 CFR 54.21(d).	A summary of the programs identified to manage the effects of aging for Class 1 piping and reactor coolant pumps is included in the proposed UFSAR supplement in Appendix A. A markup of the UFSAR sections affected by the TLAA evaluations is also included in the proposed UFSAR supplement.

TABLE 2.3-2 (continued)
CLASS 1 PIPING AND ASSOCIATED PRESSURE BOUNDARY COMPONENTS - APPLICANT ACTION ITEMS FROM SECTION 4.1 OF WCAP-14575 DRAFT SAFETY EVALUATION

Renewal Applicant Action Item	Turkey Point-Specific Response
(3) Applicants must provide a description of all insulation used on austenitic stainless steel Nuclear Steam Supply System piping to ensure the piping is not susceptible to stress-corrosion cracking from halogens.	During construction, the Class 1 piping was insulated in accordance with the applicable Westinghouse Equipment Specification. The specification listed specific tradenames that were approved, by Westinghouse, for use on austenitic stainless steel. As described in the Turkey Point UFSAR, Section 4.2.5 "...external corrosion resistant surfaces in the reactor coolant system are insulated with low halide or halide free insulating material..." During 1979 the insulation on the reactor coolant piping was changed to reflective insulation. The insulation is made of austenitic stainless steel; any nonmetallics comply with NRC Regulatory Guide 1.36. Subsequent additions of insulation were done in accordance with the applicable Bechtel specification, which also imposes the requirements of Regulatory Guide 1.36. Since all the insulation that was used on the reactor coolant piping is low halide or halide free, the piping is not susceptible to stress corrosion cracking initiated by such halides.
(4) The license renewal applicant should describe how each plant-specific AMP addresses the following 10 elements: (1) scope of the program, (2) preventive actions, (3) parameters monitored or inspected, (4) detection of aging effects, (5) monitoring and trending, (6) acceptance criteria, (7) corrective actions, (8) confirmation process, (9) administrative controls, and (10) operating experience.	Programs necessary to manage the effects of aging for Class 1 piping and reactor coolant pumps address the 10 elements identified. These programs are described in Appendix B.
(5) The license renewal applicant should perform additional fatigue evaluations or propose an AMP to address the components labeled I-M and I-RA in Tables 3-2 through 3-16 of WCAP-14575.	Turkey Point has performed a plant-specific fatigue evaluation for Turkey Point Class 1 piping and reactor coolant pumps. This evaluation is included in Section 4.3.

TABLE 2.3-2 (continued)
CLASS 1 PIPING AND ASSOCIATED PRESSURE BOUNDARY COMPONENTS - APPLICANT ACTION ITEMS FROM SECTION 4.1 OF WCAP-14575 DRAFT SAFETY EVALUATION

Renewal Applicant Action Item	Turkey Point-Specific Response
(6) The staff recommendation for the closure of GSI-190 "Fatigue Evaluation of Metal Components for 60-Year Plant Life" is contained in a December 26, 1999, memorandum from Ashok Thadani to William Travers. The license renewal applicant should address the effects of the coolant environment on component fatigue life as aging management programs are formulated in support of license renewal. The evaluation of a sample of components with high-fatigue usage factors using the latest available environmental fatigue data is an acceptable method to address the effects of the coolant environment on component fatigue life.	Turkey Point has performed a plant-specific evaluation for Turkey Point Class 1 piping and reactor coolant pumps with regard to environmental effects on fatigue. This evaluation is included in Subsection 4.3.5.

TABLE 2.3-3
CLASS 1 PIPING AND ASSOCIATED PRESSURE BOUNDARY COMPONENTS - OPEN ITEMS FROM SECTION 4.2 OF WCAP-14575 DRAFT SAFETY EVALUATION

Open Item	Turkey Point-Specific Response
(1) Westinghouse Owners Group should complete the specific revisions to the subject topical report that it has committed to perform in response to the staff's requests for additional information discussed in Section 3.1 of the safety evaluation. As described by WOG in its letter to the staff, dated July 19, 1999, these planned modifications are limited to Section 2.3.2.2, "Branch Line Restrictors," Section 2.3.2.4, "Thermal Barrier and RCP Seals," and the "summary" sections of the topical report.	The Turkey Point Class 1 piping aging management review includes branch line restrictors and their associated license renewal component intended function of throttling. The aging management review of the Class 1 piping is addressed in Subsection 3.2.1 and summarized in Table 3.2-1. The Turkey Point position regarding reactor coolant pump seals is summarized in Subsection 2.3.1.7.
(2) Westinghouse Owners Group should complete the updated review of generic communications and revise Section 3.1 of the topical report to describe the process used by the Westinghouse Owners Group to perform the review and to capture any additional items not identified by the original review.	Turkey Point has completed an updated review of generic communications for applicability to Class 1 piping and reactor coolant pumps. All generic communications applicable to aging effects are summarized in Subsections 3.2.1 and 3.2.6.
(3) The topical report indicates that thermal aging-related cracking of austenitic steel castings is an aging effect that the Westinghouse Owners Group considers potentially significant for the Reactor Coolant System piping and associated components. Thermal aging does not cause cracking, it causes a reduction in the fracture toughness of the material. The reduction in fracture toughness of the material results in a reduction in the critical flaw size that could lead to component failure. The Westinghouse Owners Group should revise the topical report, accordingly.	Turkey Point's aging management review methodology identifies reduction in fracture toughness as the aging effect related to thermal aging. Reduction in fracture toughness for Class 1 piping and reactor coolant pumps is addressed in Subsections 3.2.1 and 3.2.6.

TABLE 2.3-3 (continued)
CLASS 1 PIPING AND ASSOCIATED PRESSURE BOUNDARY COMPONENTS - OPEN ITEMS FROM SECTION 4.2 OF WCAP-14575 DRAFT SAFETY EVALUATION

Open Item	Turkey Point-Specific Response
(4) Components that have delta ferrite levels below the susceptibility screening criteria have adequate fracture toughness and do not require supplemental inspection. As a result of thermal embrittlement, components that have delta ferrite levels exceeding the screening criterion may not have adequate fracture toughness and do require additional evaluation or examination. Westinghouse Owners Group should address thermal-aging issues in accordance with the staff's comments in Section 3.3.3 of this evaluation.	As noted above for Open Item 3, reduction in fracture toughness for Class 1 piping and reactor coolant pumps is addressed in Subsections 3.2.1 and 3.2.6. The Turkey Point methodology is consistent with the staff's comments.
(5) Westinghouse Owners Group should propose to perform additional inspection of small-bore Reactor Coolant System piping, that is, less than 4-inch-size piping, for license renewal to provide assurance that potential cracking of small-bore Reactor Coolant System piping is adequately managed during the period of extended operation.	The aging management review and specific program commitments for Class 1 small bore piping are addressed in Subsection 3.2.1 and summarized in Table 3.2-1.
(6) Westinghouse Owners Group should revise AMP-3.6 to include an assessment of the margin on loads in conformance with the staff guidance provided in Reference 11. In addition, AMP-3.6 should be revised to indicate If the CASS component is repaired or replaced per ASME Code, Section XI IWB-4000 or IWB-7000, a new LBB analysis based on the material properties of the repaired or replaced component (and accounting for its thermal aging through the period of extended operation, as appropriate), is required to confirm the applicability of LBB. The inservice examination/flaw evaluation option is, per the basis on which the NRC staff has approved LBB in the past, insufficient to reestablish LBB approval.	The original Turkey Point Leak-Before-Break (LBB) analysis was performed consistent with the criteria specified in NUREG-1061, Volume 3, and utilized the modified limit load method as specified in the draft Standard Review Plan, Section 3.6.3. The NRC review and safety evaluation of the original Turkey Point LBB analysis is documented in the June 23, 1995, NRC letter to FPL [Reference 2.3-13]. The revised Turkey Point LBB analysis, which addresses the extended period of operation, utilizes a methodology consistent with the original LBB analysis. If Class 1 piping CASS components are repaired or replaced, Turkey Point design control procedures would require a new LBB analysis based on replacement material properties.

TABLE 2.3-4
ENGINEERED SAFETY FEATURES EVALUATION BOUNDARIES[1]

Drawing Number	Revision
Emergency Containment Cooling	
3-E/NCC-01	0
4-E/NCC-01	0
Containment Spray	
3-CS-01	0
4-CS-01	0
Containment Isolation	
3-BA-01	0
4-BA-01	0
0-N2H2-01	0
3-CP-01	0
4-CP-01	0
Safety Injection	
3-SI-01	0
3-SI-02	0
3-SI-03	0
4-SI-01	0
4-SI-02	0
4-SI-03	0
Residual Heat Removal	
3-RHR-01	0
4-RHR-01	0
Emergency Containment Filtration	
3-ECF-01	0
4-ECF-01	0
Containment Post Accident Monitoring and Control	
0-PAMC-01	0
0-PAMC-02	0
3-PAMC-01	0
4-PAMC-01	0

NOTE: 1. Drawings submitted separately [Reference 2.3-14].

TABLE 2.3-5
AUXILIARY SYSTEMS
EVALUATION BOUNDARIES[1]

Drawing Number	Revision
Intake Cooling Water	
3-ICW-01	0
3-ICW-02	0
4-ICW-01	0
4-ICW-02	0
Component Cooling Water	
3-CCW-01	0
3-CCW-02	0
3-CCW-03	0
3-CCW-04	0
3-CCW-05	0
4-CCW-01	0
4-CCW-02	0
4-CCW-03	0
4-CCW-04	0
Spent Fuel Pool Cooling	
3-SFP-01	0
3-SI-01	0
4-SFP-01	0
4-SI-01	0
Chemical and Volume Control	
0-CVCS-01	0
0-CVCS-02	0
3-CVCS-01	0
3-CVCS-02	0
3-CVCS-03	0
4-CVCS-01	0
4-CVCS-02	0
4-CVCS-03	0

NOTE: 1. Drawings submitted separately [Reference 2.3-14].

TABLE 2.3-5 (continued)
AUXILIARY SYSTEMS
EVALUATION BOUNDARIES[1]

Drawing Number	Revision
Primary Water Makeup	
3-PW-01	0
3-RCS-03	0
3-CVCS-01	0
4-PW-01	0
4-RCS-03	0
4-CVCS-01	0
Sample System – Nuclear Steam Supply System	
3-SAMP-03	0
3-RCS-01	0
3-RCS-02	0
3-CVCS-01	0
3-CVCS-02	0
3-SI-03	0
4-SAMP-03	0
4-RCS-01	0
4-RCS-02	0
4-CVCS-01	0
4-CVCS-02	0
4-SI-03	0
Sample System - Secondary	
3-SAMP-01	0
3-SAMP-02	0
3-FW-04	0
3-MS-01	0
4-SAMP-01	0
4-SAMP-02	0
4-FW-04	0
4-MS-01	0
Waste Disposal	
0-WD-01	0
0-WD-02	0

NOTE: 1. Drawings submitted separately [Reference 2.3-14].

TABLE 2.3-5 (continued)
AUXILIARY SYSTEMS
EVALUATION BOUNDARIES[1]

Drawing Number	Revision
Waste Disposal (continued)	
3-WD-01	0
3-RCS-02	0
4-WD-01	0
4-RCS-02	0
Instrument Air	
0-IA-01	0
3-IA-01	0
3-IA-02	0
3-IA-03	0
3-IA-04	0
3-IA-05	0
3-IA-06	0
3-IA-07	0
3-IA-08	0
3-IA-09	0
3-CVCS-02	0
3-CVCS-03	0
3-CP-01	0
3-FW-03	0
3-RHR-01	0
3-MS-01	0
4-IA-01	0
4-IA-02	0
4-IA-03	0
4-IA-04	0
4-IA-05	0
4-CVCS-02	0
4-CVCS-03	0
4-CP-01	0
4-FW-03	0
4-RHR-01	0
4-MS-01	0

NOTE: 1. Drawings submitted separately [Reference 2.3-14].

TABLE 2.3-5 (continued)
AUXILIARY SYSTEMS
EVALUATION BOUNDARIES[1]

Drawing Number	Revision
Normal Containment And Control Rod Drive Mechanism Cooling	
3-E/NCC-01	0
4-E/NCC-01	0
Auxiliary Building Ventilation	
0-ABVAC-01	0
0-ABVAC-02	0
Control Building Ventilation	
0-CBVAC-01	0
0-CBVAC-02	0
0-CBVAC-03	0
Emergency Diesel Generator Building Ventilation	
4-EDVAC-01	0
Turbine Building Ventilation	
3-TBVAC-01	0
3-TBVAC-02	0
4-TBVAC-01	0
4-TBVAC-02	0
Fire Protection	
0-FP-01	0
0-FP-02	0
0-FP-03	0
0-FP-04	0
0-FP-05	0
0-FP-06	0
0-FP-07	0
0-FP-08	0
0-FP-09	0
0-FP-10	0
3-RCS-03	0
4-RCS-03	0

NOTE: 1. Drawings submitted separately [Reference 2.3-14].

TABLE 2.3-5 (continued)
AUXILIARY SYSTEMS
EVALUATION BOUNDARIES[1]

Drawing Number	Revision
Emergency Diesel Generators and Support Systems	
3-EDG-01	0
3-EDG-02	0
3-EDG-03	0
3-EDG-04	0
3-EDG-05	0
3-EDG-06	0
4-EDG-01	0
4-EDG-02	0
4-EDG-03	0
4-EDG-04	0
4-EDG-05	0
4-EDG-06	0

NOTE: 1. Drawings submitted separately [Reference 2.3-14].

TABLE 2.3-6
STEAM AND POWER CONVERSION SYSTEMS EVALUATION BOUNDARIES[1]

Drawing Number	Revision
Main Steam and Turbine Generators	
3-MS-01	0
3-MS-02	0
3-MS-03	0
3-SAMP-02	0
3-TG-01	0
4-MS-01	0
4-MS-02	0
4-MS-03	0
4-SAMP-02	0
4-TG-01	0
Feedwater and Blowdown	
0-FW-01	0
0-FW-02	0
3-FW-01	0
3-FW-02	0
3-FW-03	0
3-FW-04	0
4-FW-01	0
4-FW-02	0
4-FW-03	0
4-FW-04	0

NOTE: 1. Drawings submitted separately [Reference 2.3-14].

TABLE 2.3-6 (continued)
STEAM AND POWER CONVERSION SYSTEMS EVALUATION BOUNDARIES[1]

Drawing Number	Revision
Auxiliary Feedwater and Condensate Storage	
0-AFW-01	0
0-AFW-02	0
3-AFW-01	0
3-AFW-02	0
3-AFW-03	0
3-COND-01	0
4-AFW-01	0
4-AFW-02	0
4-AFW-03	0
4-COND-01	0

NOTE: 1. Drawings submitted separately [Reference 2.3-14].

2.4 SCOPING AND SCREENING RESULTS - STRUCTURES

The determination of structures within the scope of license renewal is made by initially identifying Turkey Point structures and then reviewing them to determine which ones satisfy one or more of the criteria contained in 10 CFR 54.4. This process is described in Section 2.1 and the results of the structures review are contained in Section 2.2.

Section 2.1 also provides the methodology for determining the components within the scope of 10 CFR 54.4 that meet the requirements contained in 10 CFR 54.21(a)(1). The components that meet these screening requirements are identified in this section. These identified components subsequently require an aging management review for license renewal.

The screening results are provided below in two subsections:

- Containments
- Other structures

2.4.1 CONTAINMENTS

Each Turkey Point Containment is a domed concrete, steel reinforced structure that houses the reactor vessel, Reactor Coolant System, Reactor Coolant System supports, and other important systems which interface with the Reactor Coolant System. Additionally, each Containment houses and supports components required for plant refueling. This includes the polar crane, refueling cavity, and portions of the fuel handling system. The Containment for each unit is the third and final barrier against the possible release of radioactive material to the environment during the unlikely event of a failure of the Reactor Coolant System.

The Turkey Point Units 3 and 4 UFSAR classifies the Containments as Class I structures designed to prevent the uncontrolled release of radioactivity. Class I structures have been determined to meet the criteria of 10 CFR 54.4 and are within the scope of license renewal. For screening, each Containment was divided into two categories, Containment Structure and Containment Internal Structural Components. Each Containment category was then subdivided into component/commodity sets to determine those structures and components requiring an aging management review. The component/commodity sets were developed based on a review of Turkey Point plant-controlled drawings, the UFSAR, the plant equipment database, and guidance from NEI 95-10 [Reference 2.4-1]. The Containments are described in UFSAR Section 5.1.

Turkey Point actively participated in a Westinghouse Owners Group effort that developed a series of generic technical reports whose purpose was to demonstrate that aging effects are adequately managed for the period of extended operation. WCAP-14756, "License Renewal Evaluation: Aging Management Evaluation for Pressurized Water Reactor Containment Structures," was submitted by Westinghouse to the NRC for approval . The draft NRC Safety Evaluation has not been issued for WCAP-14756. Turkey Point does not utilize or credit this generic technical report in this Application.

Containment structural components requiring an aging management review are identified in the following subsections. Note that the discussions below apply to the Containments for both Units 3 and 4.

2.4.1.1 CONTAINMENT STRUCTURE

2.4.1.1.1 CONCRETE

Each Containment structure consists of a post-tensioned reinforced concrete cylinder and a shallow dome connected to and supported by a reinforced concrete foundation slab. The combined strength provided by the concrete, conventional reinforcing steel, and the post-tensioning system is used to satisfy the design loads. Although these components act together as one composite system, the post-tensioning system is described as a separate component/commodity because it is installed and stressed after the reinforced concrete components are complete and because of the unique tendon surveillance program.

DOME AND CYLINDER WALLS

Cast-in-place concrete is used for each containment dome and shell (cylinder wall). In general, the concrete placement in the walls is done in ten-foot high lifts with vertical joints at the radial centerline of each of the six buttresses. Intermediate grade steel is used for bonded reinforcing throughout the cylinder and dome as crack control reinforcing. At areas of discontinuities, higher strength reinforcing steel is used to provide an additional margin of elastic strain capability. The Containment structures are described in UFSAR Section 5.1.2.

Turkey Point uses a waterproofing membrane underneath the foundation mat and outside the lower portions of the Containment Structure wall as a design feature to act as a measure of protection to manage or inhibit the intrusion of groundwater. The exterior containment walls located below grade also have embedded waterstops installed to inhibit the intrusion or seepage of groundwater. Although the membrane system provides a measure of protection, no credit was taken for the continued performance in the determination of aging effects. The waterproofing membrane and waterstops are piece parts and are not identified as unique structures or unique components. The waterproofing membrane and waterstops are considered design features that perform no intended function, and thus, are not in the scope of license renewal.

FLOORS

A reinforced concrete floor is provided in each Containment, above the embedded floor liner, to protect the liner plate from punctures and corrosion that could breach

the essentially leaktight barrier. The containment floors are described in UFSAR Sections 5.1.2 and 5.1.6.

Moisture barriers consisting of 1½"-deep sealing compound are provided between the liner air test system and concrete floors at elevation 14' to prevent intrusion of moisture between the concrete and liner surfaces. The sealing compound is Nukem 720 Elastik made by Amercoat Corporation. The space between the concrete and liner is filled with mastic material ¼" thick.

FOUNDATION SLABS

The conventionally reinforced concrete foundation slab serves as the structural foundation support for each Containment. The vertical tendons extend through the foundation slab and are anchored on the underside of the slab. A reinforced concrete enclosure (tendon access gallery) is provided for each Containment at the underside of the foundation slab perimeter for access to the lower vertical tendon anchorage for tendon inspection and surveillance purposes. High-strength reinforcing steel, mechanically spliced with T-Series Cadwelds, is used throughout the base slabs. The containment foundation slab is described in UFSAR Section 5.1.2.

The function of the tendon access galleries is to provide access to the bottom of the vertical tendons and to the horizontal lower tendons so they can be tested. Loss of function of the tendon access galleries is highly unlikely and to consider such is hypothetical. Per NEI 95-10 [Reference 2.4-1], consideration of hypothetical failures that could result from system interdependencies that are not part of the current licensing basis and that have not been previously experienced is not required. Accordingly, the lower tendon access galleries and the inspection pits do not support the intended function of the Containment structures.

2.4.1.1.2 STEEL

ANCHORS, EMBEDMENTS, AND ATTACHMENTS

Structural steel commodities include anchors, embedments, and attachments such as angles and anchor studs that are welded to the liner and serve to anchor each liner to the containment shells. In addition, other anchors, embedments, and attachments are provided that serve to transfer loads into the concrete cylinder walls or foundation mats from attachments to the liners.

Each liner plate is attached to the concrete by means of an angle grid system welded to the liner plate and embedded in the concrete. The anchor spacing is designed to maintain the essentially leaktight barrier by preserving the integrity of the liner. The load-carrying capacity of these anchorages is also required to assure that supported equipment, such as the polar cranes, can perform safely as required. The polar crane bracket attachments are welded to the liner and embedded in the concrete shell. Containment anchors, embedments, and attachments are described in UFSAR Section 5.1.2.

STEEL LINER PLATES

The interior of each Containment is lined with steel plates that are welded together. The liner plate covers the dome and cylinder walls and runs between the floor and the foundation slab to form an essentially leaktight barrier. The liners help assure leak tightness of the Containments. The liner plate for the floors is placed on top of the foundation concrete pour and is covered with an additional concrete floor cover. The liner plate for the walls is welded to an angle grid system embedded in concrete. The grid system is designed to allow for distortion during accident conditions without compromising the essentially leaktight barrier of the Containments. The liner plates are thickened at attachments such as the polar crane brackets to reduce predicted stress level in the plane of the liner plate. The containment steel liner plates are described in UFSAR Section 5.1.2.

The external surface of the liner plates, except for the floor liners, is coated on the inside with inorganic zinc primer and painted. The application of protective coatings on the liner surfaces ensures that the external metal surface is not in contact with a moist environment for extended periods of time. Although coated, no credit is taken for protective coatings applied to the liner in the determination of aging effects.

Coatings qualified for use in the Turkey Point Units 3 and 4 Containments are adequate to resist exposures due to both normal operating and design basis accident conditions. These exposures include ionizing radiation, high temperature and pressure, impingement from jets or sprays, and abrasion due to traffic. Generic Letter 98-04, "Potential for Degradation of the Emergency Core Cooling System and The Containment Spray System after a Loss-Of-Coolant Accident Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment," was issued to alert licensees to the problems associated with the material condition of protective coatings inside containments. The generic letter was issued to request information to evaluate plant programs for ensuring coatings inside

containments do not detach from their substrate and interfere with operation of accident mitigation systems. Turkey Point's response to Generic Letter 98-04 [Reference 2.4-2] indicated that coating logs are maintained and documented in controlled calculations. The logs are reviewed and updated after each refueling outage. In addition, an assessment of the overall condition of coatings is performed prior to unit restart after each refueling outage to ensure that coatings will have no effect on operation of accident mitigation systems.

CATHODIC PROTECTION

Structural steel components such as the tendon trumplates, reinforcing bars, and liner plates are interconnected to form an electrically continuous cathodic structure. Cathodic protection is provided to make these steel components electrically negative with respect to the soil to prevent galvanic corrosion. Cathodic protection is a non-safety related design feature that does not perform intended functions as defined by 10 CFR 54.4(a). Additionally, no credit is taken for the cathodic protection system in the determination of aging effects. Accordingly, the cathodic protection system is not within the scope of license renewal.

FUEL TRANSFER TUBES

The fuel transfer tube for each Containment penetrates the Containment to link the refueling canal inside the Containment and the spent fuel pool in the auxiliary building. The fuel transfer tubes serve as the underwater pathways for moving the fuel assemblies into and out of the Containments for refueling operations during plant shutdown. As part of the containment pressure boundary, the fuel transfer tubes must assure the essentially leaktight barrier function of the Containment.

During normal operation, blind flanges are installed on the fuel transfer tube penetrations and serve as part of the Containment essentially leaktight barrier. The fuel transfer tubes are described in UFSAR Sections 6.6.2.1 and 6.6.3.

PENETRATIONS

All penetrations are designed to maintain an essentially leaktight barrier to prevent the uncontrolled release of radioactivity. In addition to supporting the essentially leaktight barrier function, each penetration performs service-related functions. Penetrations may also serve as support points for systems such as piping passing through the Containment boundary.

PENETRATION ASSEMBLIES (MECHANICAL)

Mechanical penetrations provide the means for passage of process piping transmitting liquids or gases across the Containment boundary. The piping and ventilation penetrations are of the rigid welded type and are solidly anchored to the containment wall, thus precluding any requirement for expansion bellows. Mechanical penetrations are described in UFSAR Section 5.1.5.2.

PENETRATION ASSEMBLIES (ELECTRICAL)

Electrical penetrations provide the means for electrical and instrumentation conductors to cross the Containment boundary while maintaining the essentially leaktight barrier. Electrical penetrations consist of carbon steel pipe canisters with stainless steel or carbon steel header plates welded to each other. Each canister affords a double barrier against leakage. The non-pressure boundary (non-metallic) portions of electrical penetrations are addressed in Section 2.5. Electrical penetrations are described in UFSAR Section 5.1.5.3.

EQUIPMENT HATCHES

The equipment hatch on each Containment is a large flanged penetration that provides access to the containment interior at the mezzanine level. A double gasketed dished head made of steel plate seals the opening. This head is bolted to the liner with 48 one-inch diameter bolts. A double O-ring seal, with the O-rings in grooves in the head flange, makes up the final seal. Leaktightness of the seals can be checked from outside Containment by pressurizing the annular space between the two O-rings. The equipment hatches are described in UFSAR Section 5.1.5.1.

CONTAINMENT PERSONNEL HATCHES

The containment personnel hatch on each Containment is a cylindrical tube that passes through the concrete wall of the Containment and is welded to the steel liner. The cylinder has a door at each end, mechanically interlocked so that one door cannot be opened unless the other is closed. A mechanical interlock defeat will permit both doors to be open at the same time. The doors also have interlocks to prevent opening a door unless the differential pressure is essentially zero and to prevent concurrently opening the equalizing valves on both doors.

The doors are pressure seating type, opening towards the inside of the Containment. Each door is provided with double gaskets. The door seal is made of

two O-rings installed in machined grooves on the bulkhead face. The machined surface of the doorplate seals against the O-rings when the door is locked. The door locks pull the door to a metal-to-metal contact on either side of the seals, thereby compressing the O-rings. The containment personnel hatches are described in UFSAR Section 5.1.5.1.

CONTAINMENT PERSONNEL ESCAPE HATCHES

The containment personnel escape hatch on each Containment is a cylindrical tube that passes through the concrete wall of the Containment and is welded to the liner. The tube has a circular door opening at each end. Each door is provided with double gaskets. The door seal is made of two O-rings installed in machined grooves on the bulkhead face. The machined surface of the doorplate seals against the O-rings when the door is locked. The door locks pull the door to a metal-to-metal contact on either side of the seal, thereby compressing the O-rings. The containment personnel escape hatches are described in UFSAR Section 5.1.5.1.

2.4.1.1.3 POST-TENSIONING SYSTEMS

The post-tensioning system for each Containment consists of numerous tendons placed around the containment walls, both vertically and horizontally, and over the containment dome. The tendons are enclosed in a sheathing system that consists of spirally wound sheet metal tubing that acts as housing for the tendons. The tendons are installed in the sheathing system, then tensioned to the prestress values required for containment integrity.

Each containment cylinder wall is prestressed by 180 vertical tendons, anchored at the top surface of the ring girder and at the bottom of the foundation slab, and 489 hoop tendons, each enclosing 120° of arc anchored in six vertical buttresses. Each dome is prestressed by three groups of 55 tendons, oriented at 120° to each other, for a total of 165 tendons anchored at the vertical face of the dome ring girder. Each tendon consists of 90 wires bundled together with buttonheaded tendon wires (Birkenmeier Brandestinin Ros Vogt or BBRV system) anchorage. The containment post tensioning system is described in UFSAR Sections 5.1.2 and 5.1.6.

2.4.1.2 CONTAINMENT INTERNAL STRUCTURAL COMPONENTS

The Containment internal structural components for each Containment consist mainly of the reactor primary shield wall, the lower secondary compartments, the

upper secondary compartments, the refueling cavity, and system/component supports.

2.4.1.2.1 CONCRETE

The primary shield walls are thick cylindrical walls that enclose the reactor vessels and provide biological shielding and structural support. The primary shield walls also act as part of the missile barrier. The lower secondary compartments for each Containment enclose the reactor coolant loops and consist of the secondary shield walls that support the intermediate floor. The upper secondary compartments for each Containment consist of four compartments. Three of these compartments enclose one reactor coolant loop each and another encloses the pressurizer. The compartment walls provide secondary biological shielding and structural support for the operating floor.

The refueling cavity/refueling canal for each Containment is a stainless steel lined reinforced concrete structure that forms a pool, above the reactor, when it is filled with borated water for refueling. It is irregularly shaped, formed by the upper portions of the primary shield concrete and other sidewalls of varying thicknesses and contains space for storing the upper and lower reactor internals packages and miscellaneous refueling tools.

Barriers surround all high-pressure equipment, i.e., high-energy reactor coolant system piping and components, which could generate missiles as a result of a design basis accident. These barriers, principally the primary and secondary shield walls, prevent such missiles from damaging the containment liner, piping penetrations, and the required engineered safeguards systems. A removable reinforced concrete shield, located above each reactor vessel head, provides missile protection for any missile that could be generated by the control rod drive mechanisms.

Concrete walls, floors, beams, equipment pads, and other miscellaneous concrete components are of conventional design using intermediate grade reinforcing steel. The concrete Containment internal structural components are described in UFSAR Section 5.1.2.

2.4.1.2.2 STEEL

POLAR CRANES

The reactor polar cranes and associated rails are seismically qualified Class I structures in the unloaded configuration. The cranes provide a means for lifting and handling heavy loads inside the Containment structures. The polar crane is described in UFSAR Sections 5A-1.2.8, 5E-2.8, and 5I-3.7.

SPENT FUEL STORAGE AND HANDLING

Spent fuel handling equipment located inside each Containment includes the reactor cavity seal ring, the manipulator crane, and portions of the fuel transfer system. The spent fuel handling equipment inside Containment is evaluated with the remainder of the Spent Fuel Storage and Handling System in Subsection 2.4.2. The spent fuel handling equipment is described in UFSAR Section 9.5.

CONTAINMENT SUMPS

For each Containment, there are two containment recirculation sumps, each with a line that leads from the containment sump to the suction of the residual heat removal pumps. Following a postulated loss-of-coolant accident, the pumps take suction on the sumps and deliver spilled reactor coolant and borated refueling water back to the core through the residual heat removal heat exchangers.

Filtration of the water entering the residual heat removal pump suction piping is accomplished by screens located over the sumps. The containment recirculation sumps are described in UFSAR Sections 6.2.1 and 6.4.2.

REACTOR COOLANT SYSTEM SUPPORTS

Reactor Coolant System supports that are subject to aging management review include the reactor vessel supports, steam generator supports, pressurizer supports, and reactor coolant pump supports. The Reactor Coolant System supports are designed to resist operating loads, pipe rupture loads, and seismic loads.

The NRC issued a draft safety evaluation for Westinghouse Owners Group generic technical report WCAP-14422, "License Renewal Evaluation: Aging Management for Reactor Coolant System Supports," Revision 2 [Reference 2.4-3], on February 25, 2000 [Reference 2.4-4].

Turkey Point reviewed the current design and operation of the Reactor Coolant System piping using the process described in Subsection 2.3.1.1.1 and confirmed that the operating environments used in the design of the Turkey Point Reactor Coolant System supports are consistent with the description contained in WCAP-14422. The Reactor Coolant System supports contain materials beyond those identified in Table 2-4 of WCAP-14422. These additional materials were included in the Reactor Coolant System supports aging management review described in Subsection 3.6.1.5. The component intended functions for the Turkey Point Reactor Coolant System supports are consistent with the intended functions identified in WCAP-14422.

As a result of the NRC review of WCAP-14422, several open items and license renewal applicant action items were identified. These open items and applicant action items are described in the draft NRC safety evaluation of WCAP-14422. The Turkey Point-specific responses to those open items and applicant action items relevant to the identification of Reactor Coolant System supports subject to aging management review are provided in Tables 2.4-1 and 2.4-2. Major component supports are described in UFSAR Section 5.1.9.

In addition to the Reactor Coolant System supports addressed by WCAP-14422, other supports are provided for various systems and components inside Containment. These supports are addressed as steel commodities below.

STEEL COMMODITIES

Structural and miscellaneous steel are provided in each Containment structure to allow access to the various elevations and areas inside Containment for inspection and maintenance. The steel also provides support for safety-related and non-safety related systems and components, including: piping, ducts, miscellaneous equipment, electrical cable tray and conduit, instruments and tubing, electrical and instrumentation enclosures and racks, steel beams and columns, stairways, ladders, and attachments to the concrete walls and liner. Containment internal structural steel is discussed in UFSAR Section 5.1.

Similar to the liner plates discussed in Subsection 2.4.1.1, the external surfaces of steel are coated. The application of protective coatings on steel surfaces ensures that the external metal surface is not in contact with a moist environment for extended periods of time. Although coated, no credit is taken for protective coatings in the determination of aging effects.

2.4.1.3 CONCLUSION

The Containments are in the scope of license renewal because they:

- Provide pressure boundary and/or fission product barrier
- 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 required safety-related functions
- Provide flood protection barriers
- Provide filtration of process fluid to protect downstream equipment
- Provide structural support and shelter to components relied on during certain postulated fire, anticipated transients without scram, and station blackout events

A complete list of Containment structural components requiring an aging management review and the component intended functions are provided in Table 3.6-2. The aging management review of the Containments is discussed in Subsection 3.6.1. Note that only the fuel transfer tube blind flanges are included with the Containment aging management review. The aging management review of the fuel transfer tubes, penetration sleeves, and gate valves is discussed in Subsection 3.6.2 as part of Spent Fuel Storage and Handling.

2.4.2 OTHER STRUCTURES

The following structures are included in this subsection:

- Auxiliary Building
- Cold Chemistry Lab
- Control Building
- Cooling Water Canals
- Diesel Driven Fire Pump Enclosure
- Discharge Structure
- Electrical Penetration Rooms
- Emergency Diesel Generator Buildings
- Fire Protection Monitoring Station
- Fire Rated Assemblies
- Intake Structure
- Main Steam and Feedwater Platforms
- Plant Vent Stack
- Spent Fuel Storage and Handling
- Turbine Building
- Turbine Gantry Cranes
- Turkey Point Units 1 and 2 Chimneys
- Yard Structures

2.4.2.1 AUXILIARY BUILDING

The Auxiliary Building is a reinforced concrete structure that houses safety-related systems, structures, and components. Failure of the Auxiliary Building, or certain portions thereof, to adequately resist the applicable design loads could result in adverse interaction with SSCs important to nuclear safety. The fuel handling building structure (including the concrete spent fuel pool and the concrete sliding door) is part of the Auxiliary Building.

The building is constructed on a foundation mat with concrete bearing walls and slabs. Earthquake, wind, and other appropriate lateral loads are resisted by diaphragm action of the walls and slabs. Ductile behavior of all the walls and slabs is maintained for better resistance of dynamic loads. The Auxiliary Building is shown in Figure 2.2-1 and is described in UFSAR Section 5.2.

The Auxiliary Building is in the scope of license renewal because it:

- Provides structural support to safety-related components
- Provides shelter/protection to safety-related components (including radiation shielding)
- Provides rated fire barriers to retard spreading of a fire
- Provides missile barriers
- Provides structural support to non-safety related components whose failure could prevent satisfactory accomplishment of required safety-related functions
- Provides flood protection barriers
- Provides structural support and shelter to components relied on during certain postulated fire and station blackout events
- Provide pipe whip restraint and/or jet impingement protection

A complete list of Auxiliary Building structural components requiring an aging management review and the component intended functions are provided in Table 3.6-3. The aging management review for the Auxiliary Building is discussed in Subsection 3.6.2.

2.4.2.2 COLD CHEMISTRY LAB

The Cold Chemistry Lab is a concrete building with a concrete roof. It is located southwest of the turbine building. The Cold Chemistry Lab does not perform any safety-related functions, or directly protect safety-related equipment. The Cold Chemistry Lab is shown in Figure 2.2-1.

The Cold Chemistry Lab is in the scope of license renewal because:

- It is a non-safety related structure whose failure could prevent satisfactory accomplishment of required safety-related functions

A complete list of Cold Chemistry Lab structural components requiring an aging management review and the component intended functions are provided in Table 3.6-4. The aging management review for the Cold Chemistry Lab is discussed in Subsection 3.6.2.

2.4.2.3 CONTROL BUILDING

The Control Building is a three-story reinforced concrete structure housing safety related systems, structures, and components. The Control Building walls and roof are designed to withstand missile effects. The Control Building is shown in Figure 2.2-1 and is described in UFSAR Section 5.3-1.

The Control Building is in the scope of license renewal because it:

- Provides structural support to safety-related components
- Provides shelter/protection to safety-related components (including radiation shielding)
- Provides rated fire barriers to retard spreading of a fire
- Provides missile barriers
- Provides structural support to non-safety related components whose failure could prevent satisfactory accomplishment of required safety-related functions
- Provides structural support and shelter to components relied on during certain postulated fire, anticipated transients without scram, and station blackout events

A complete list of Control Building structural components requiring an aging management review and the component intended functions are provided in Table 3.6-5. The aging management review for the Control Building is discussed in Subsection 3.6.2.

2.4.2.4 COOLING WATER CANALS

The Cooling Water Canals serve as the plant ultimate heat sink. The Cooling Water Canals constitute a closed cooling system made up of earthen canals that provide cooling of discharged water prior to reuse at the intake structure. The Cooling Water Canals are shown in Figure 3.1-2 of the License Renewal Application Environmental Report.

The Cooling Water Canals are in the scope of license renewal because they:

- Provide a source of cooling water for plant shutdown

A complete list of Cooling Water Canals structural components requiring an aging management review and the component intended functions are provided in Table 3.6-6. The aging management review for the Cooling Water Canals is discussed in Subsection 3.6.2.

2.4.2.5 DIESEL DRIVEN FIRE PUMP ENCLOSURE

The Diesel Driven Fire Pump is protected from the external environment by a prefabricated enclosure. The enclosure is designed in accordance with the South Florida Building Code. The structure is anchor bolted to a reinforced concrete foundation. Access is provided through double doors at both ends of the building. The Diesel Driven Fire Pump Enclosure is shown in Figure 2.2-1.

The Diesel Driven Fire Pump Enclosure, although not specifically credited for fire protection, has been conservatively included in the scope of license renewal because it:

- Provides shelter to components relied on during certain postulated fire events

A complete list of Diesel Driven Fire Pump Enclosure structural components requiring an aging management review and the component intended functions are provided in Table 3.6-7. The aging management review for the Diesel Driven Fire Pump Enclosure is discussed in Subsection 3.6.2.

2.4.2.6 DISCHARGE STRUCTURE

Engineering features located along the west edge of the plant secured area are collectively referred to as the Discharge Structure. The primary purpose of the Discharge Structure is to provide for the emission of effluent from circulating water, intake cooling water, screen wash, and storm drains into the cooling water canals.

The Unit 3 Discharge Structure includes a concrete seal well, north concrete headwall, south concrete headwall, and associated steel framing and platforms. The seal well introduces flow from the buried circulating water piping into the cooling water canals. The concrete seal well also provides a base on which structural steel framing and platforms are supported. The north headwall introduces flow from the safety-related intake cooling water pipe and non-safety related screen refuse and

storm drain pipes. The south headwall introduces flow from the non-safety related intake cooling water pipe.

The Unit 4 Discharge Structure includes a concrete seal well, south concrete headwall, and associated steel framing and platforms. The seal well introduces flow from the buried circulating water piping into the cooling water canals. The concrete seal well also provides a base on which structural steel framing and platforms are supported. The south headwall introduces flow from the safety-related intake cooling water pipe and the non-safety-related intake cooling water and storm drainpipes. Unit 4 does not require a north headwall since the screen refuse pipe is common to both Units and is part of the Unit 3 north concrete headwall.

The primary function of the headwalls is to protect the embankment from currents introduced by the discharge water. While the Discharge Structure performs no nuclear safety-related function, the safety-related intake cooling water piping penetrates the concrete headwall. Failure of the intake cooling water pipe concrete headwall could jeopardize the safety function of the Intake Cooling Water System. The Units 3 and 4 Discharge Structure is shown in Figure 2.2-1.

The Discharge Structure is in the scope of license renewal because:

- It is a non-safety related structure whose failure could prevent satisfactory accomplishment of required safety-related functions

A complete list of Discharge Structure structural components requiring an aging management review and the component intended functions are provided in Table 3.6-8. The aging management review for the Discharge Structure is discussed in Subsection 3.6.2.

2.4.2.7 ELECTRICAL PENETRATION ROOMS

Each Unit has two Electrical Penetration Rooms housing safety-related structures and components. Unit 3 has a West Electrical Penetration Room and a South Electrical Penetration Room. Unit 4 has a West Electrical Penetration Room and a North Electrical Penetration Room. All four rooms are reinforced concrete enclosures that contain electrical containment penetrations and cables. The west rooms are independent structures located immediately west of each containment. The north and south rooms are integral with the auxiliary building and are located at the western most interface between the auxiliary building and the containment

buildings. The Electrical Penetration Rooms are shown in Figure 2.2-1 and are described in UFSAR Section 5E-2.2.

The Electrical Penetration Rooms are in the scope of license renewal because they:

- 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 required safety-related functions
- Provide structural support and shelter to components relied on during certain postulated fire, anticipated transients without scram, and station blackout events

A complete list of Electrical Penetration Rooms structural components requiring an aging management review and the component intended functions are provided in Table 3.6-9. The aging management review for the Electrical Penetration Rooms is discussed in Subsection 3.6.2.

2.4.2.8 EMERGENCY DIESEL GENERATOR BUILDINGS

The original emergency on-site AC power source for Turkey Point Units 3 and 4 consisted of two emergency diesel generators. The two original emergency diesel generators are presently identified as 3A and 3B, and are housed in the Unit 3 Emergency Diesel Generator Building. In 1990 and 1991, two additional emergency diesel generator units, labeled 4A and 4B, were added to the emergency power system. The Unit 4 Emergency Diesel Generator Building was designed and constructed to house the additional units. The Emergency Diesel Generator Buildings are shown in Figure 2.2-1 and are described in UFSAR Sections 5.3.2 (Unit 3) and 5.3.4 (Unit 4).

Both the Unit 3 and Unit 4 Emergency Diesel Generator Buildings are reinforced concrete structures housing safety-related systems, structures, and components. The first floor of each building is divided into two bays, each bay containing one of the two engine-generator sets housed in the building. The Emergency Diesel

Generator Buildings also house components of the emergency diesel generator subsystems, such as the fuel oil, starting air, lubricating oil, combustion air, and exhaust air equipment.

The Emergency Diesel Generator Buildings are in the scope of license renewal because they:

- 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 required safety-related functions
- Provide flood protection barriers
- Provide structural support and shelter to components relied on during certain postulated fire, anticipated transients without scram, and station blackout events

A complete list of Emergency Diesel Generator Buildings structural components requiring an aging management review and the component intended functions are provided in Table 3.6-10. The aging management review for the Emergency Diesel Generator Buildings is discussed in Subsection 3.6.2.

2.4.2.9 FIRE PROTECTION MONITORING STATION

The Fire Protection Monitoring Station is a reinforced concrete and concrete block structure located adjacent to the west wall of the control building. The Fire Protection Monitoring Station contains numerous video screens used to monitor various areas throughout the plant for fire detection as a compensatory measure pending resolution of corrective actions related to Thermolag. The Fire Protection Monitoring Station is shown in Figure 2.2-1.

The Fire Protection Monitoring Station, although not specifically credited for fire protection, has been conservatively included in the scope of license renewal because it:

- Provides structural support and shelter to components relied on during certain postulated fire events

A complete list of Fire Protection Monitoring Station structural components requiring an aging management review and the component intended functions are provided in Table 3.6-11. The aging management review for the Fire Protection Monitoring Station is discussed in Subsection 3.6.2.

2.4.2.10 FIRE RATED ASSEMBLIES

Fire Rated Assemblies include the following: fire barriers, fire doors, fire dampers, penetration seals, and electrical conduit seals. The Fire Rated Assemblies are described in UFSAR Appendix 9.6A, Section 3.11.

Fire barriers are provided to ensure that the function of one train of redundant equipment necessary to achieve and maintain hot standby and cold shutdown conditions remains free of fire damage. Fire barriers provide a means of limiting fire travel by compartmentalization and containment. Turkey Point fire barriers include walls, floors, and ceilings; raceway protection; structural steel fireproofing; manhole covers and hatches; and radiant energy shields. Thermolag barriers, raceway protection, and structural steel fireproofing were evaluated with Fire Rated Assemblies. Concrete walls, floors, and ceilings were evaluated with the specific structure in which they reside; manhole covers were evaluated with Yard Structures; and radiant energy shields (located inside containment) were evaluated with the Containments.

Fire door assemblies prevent the spread of fire through passageways and fire barriers. Fire door assemblies protect openings in walls and partitions against the spread of fire.

Fire dampers are provided to prevent the spread of fire through ventilation penetrations. Fire dampers were evaluated with the Fire Protection System in Subsection 2.3.3.14.

Penetration seals are provided to maintain the integrity of fire barriers at barrier penetrations. Those penetrations through fire barriers that are not restored by grout or concrete are sealed as follows. Mechanical, electrical, and structural steel penetrations are sealed with solid silicone elastomer, boot seals, high-density self-supporting gel seals, prefabricated fire seals, or hydrosil material seals.

Electrical conduit seals are used to protect open-ended conduit from fixed water suppression spray, to keep Halon from escaping the area protected by Halon suppression, and to limit flame propagation. A conduit seal is provided for an open-ended conduit if the configuration of the conduit is such that water can be conducted into equipment containing electrical terminations, and for open-ended conduits in fire areas protected by Halon suppression if the conduit penetrates a boundary of the fire area. Conduit seals are also provided for conduits penetrating fire barriers as appropriate.

The Fire Rated Assemblies are in the scope of license renewal because they:

- Provide shelter/protection to safety-related components (control room fire doors are a portion of the control room environmental envelope)
- Provide fire barriers to retard spreading of a fire

A complete list of Fire Rated Assemblies structural components requiring an aging management review and the component intended functions are provided in Table 3.6-12. The aging management review for the Fire Rated Assemblies is discussed in Subsection 3.6.2.

2.4.2.11 INTAKE STRUCTURE

The Intake Structure is a reinforced concrete and steel structure consisting of eight intake channels (bays). The Intake Structure supports the six safety-related intake cooling water pumps, the eight non-safety related circulating water pumps, and the three non-safety related screen wash pumps. These pumps take suction from the intake channels and supply water to Turkey Point Units 3 and 4.

At the inlet to each channel, a stationary (grizzly) screen collects large debris to prevent damage to the traveling screens. There are eight traveling screens, one for each intake channel, located just downstream of the grizzly screens. The traveling screens remove small debris from the intake water, thus preventing debris from reaching the suction of the pumps. The Intake Structure is shown in Figure 2.2-1 and is described in UFSAR Section 5.3.2.

The Intake Structure is in the scope of license renewal because it:

- Provides structural support to safety-related components
- Provides shelter/protection to safety-related components

- Provides a source of cooling water for plant shutdown
- Provides structural support to non-safety related components whose failure could prevent satisfactory accomplishment of required safety-related functions
- Provides flood protection barriers
- Provides filtration of process fluid so that downstream equipment is protected
- Provides structural support to components relied on during certain postulated fire and station blackout events

A complete list of Intake Structure structural components requiring an aging management review and the component intended functions are provided in Table 3.6-13. The aging management review for the Intake Structure is discussed in Subsection 3.6.2.

2.4.2.12 MAIN STEAM AND FEEDWATER PLATFORMS

The Main Steam and Feedwater Platforms are steel and concrete structures, located just outside containment, that contain safety-related SCs from the main steam, feedwater, and auxiliary feedwater systems. The Main Steam Platforms are located directly west of the Unit 3 and 4 containment buildings. The Feedwater Platforms are located northwest of the Unit 3 containment and southwest of the Unit 4 containment. The Main Steam and Feedwater Platforms are shown in Figure 2.2-1.

The Main Steam and Feedwater Platforms are in the scope of license renewal because they:

- 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 required safety-related functions.
- Provide structural support and shelter to components relied on during certain postulated fire, anticipated transients without scram, and station blackout events.
- Provide pipe whip restraint and jet impingement protection.

A complete list of Main Steam and Feedwater Platforms structural components requiring an aging management review and the component intended functions are provided in Table 3.6-14. The aging management review for the Main Steam and Feedwater Platforms is discussed in Subsection 3.6.2.

2.4.2.13 PLANT VENT STACK

The Plant Vent Stack is a steel tubular structure used for releasing processed gases to the atmosphere. The Plant Vent Stack is supported at its base by the auxiliary building roof and laterally restrained near its top by the Unit 4 containment structure. Structural failure of the Plant Vent Stack could impact safety-related equipment. The Plant Vent Stack is shown in Figure 2.2-1.

The Plant Vent Stack is in the scope of license renewal because:

- It is a non-safety related structure whose failure could prevent satisfactory accomplishment of required safety-related functions

A complete list of Plant Vent Stack structural components requiring an aging management review and the component intended functions are provided in Table 3.6-15. The aging management review for the Plant Vent Stack is discussed in Subsection 3.6.2.

2.4.2.14 SPENT FUEL STORAGE AND HANDLING

Spent Fuel Handling includes all the equipment and tools necessary to remove spent fuel from the reactor vessels, transport spent fuel to the spent fuel pools, place spent fuel in the appropriate storage rack cell, and remove spent fuel from the spent fuel storage pools for alternative storage. The major equipment required for Spent Fuel Handling includes: the reactor cavity seal rings, the manipulator cranes, the fuel transfer system (located in the refueling canal inside containment and in the fuel transfer canal in the spent fuel building), the fuel transfer tubes, penetration sleeves, and gate valves, the spent fuel bridge cranes, the fuel handling tools, and the spent fuel cask crane.

Spent Fuel Storage includes all the structural components necessary to store spent fuel in the spent fuel storage pools, excluding the concrete structure. The major structural items required for Spent Fuel Storage are the spent fuel pit liners, the keyway gates, and the spent fuel storage racks. The concrete fuel handling building (including the spent fuel pool and the concrete sliding doors) is part of the auxiliary

building and is screened with the rest of the auxiliary building structure in Subsection 2.4.2.1.

The spent fuel storage pools are designed for the underwater storage of spent fuel assemblies and control rods after removal from the reactor. The spent fuel pits are lined on their interior surfaces with a stainless steel liner. Stainless steel storage racks rest on the pool floor and hold the spent fuel assemblies. Fuel assemblies are placed and held in vertical cells of a rectangular high-density array. The racks are designed so that it is impossible to insert fuel assemblies in other than the prescribed locations, thereby ensuring the necessary spacing between assemblies. The high-density stainless steel storage racks have Boraflex inserts, a proprietary neutron absorbing material. Note: Turkey Point has determined that Boraflex is not a Time-Limited Aging Analysis, however, Boraflex is addressed in Subsection 3.6.2 and the Boraflex Surveillance Program, Appendix B Subsection 3.2.2.

Spent Fuel Storage and Handling System is described in UFSAR Sections 5.2.4 and 9.5.

Spent Fuel Storage and Handling is in the scope of license renewal because it:

- Provides pressure boundary
- Provides structural support to safety-related components
- Provides shelter/protection to safety-related components (including radiation shielding)
- Provides rated fire barriers to retard spreading of a fire
- Provides missile barriers

A complete list of Spent Fuel Storage and Handling structural components requiring an aging management review and the component intended functions are provided in Table 3.6-16. The aging management review for Spent Fuel Storage and Handling is discussed in Subsection 3.6.2.

2.4.2.15 TURBINE BUILDING

The Turbine Building is a reinforced concrete and steel structure. It is primarily an open steel frame built on reinforced concrete mat foundations. The reinforced concrete turbine pedestals are the dominant structural features of the Turbine Building. The building is essentially rectangular in shape with the long north/south axis sharing the Unit 3 and 4 turbine centerline orientation. The Turbine Building is

located just west of the Unit 3 and Unit 4 Containments. The ground floor is surrounded by a floodwall to protect turbine building equipment. The Turbine Building is shown in Figure 2.2-1.

The Turbine Building houses the following Unit 3 and 4 safety-related equipment and structures: 4160V switchgear, 480V load centers, and associated concrete enclosures; the steam generator feedwater pump discharge valves and associated blockwall enclosures; and the 3A and 4A motor control centers and associated steel enclosures. In addition, the following miscellaneous safety-related equipment is included in the Turbine Building: the auxiliary feedwater supply lines from the condensate storage tanks and numerous conduits and cable trays.

The Turbine Building is in the scope of license renewal because it:

- Provides structural support to safety-related components
- Provides shelter/protection to safety-related components
- Provides rated fire barriers to retard spreading of a fire
- Provides missile barriers
- Provides structural support to non-safety related components whose failure could prevent satisfactory accomplishment of required safety-related functions
- Provides flood protection barriers
- Provides structural support and shelter to components relied on during certain postulated fire, anticipated transients without scram, and station blackout events

A complete list of Turbine Building structural components requiring an aging management review and the component intended functions are provided in Table 3.6-17. The aging management review for the Turbine Building is discussed in Subsection 3.6.2.

2.4.2.16 TURBINE GANTRY CRANES

The Turkey Point Fossil Units 1 and 2 Turbine Gantry Crane has a rated capacity of 70/15 tons. The Turkey Point Nuclear Units 3 and 4 Turbine Gantry Crane has a rated capacity of 145/35 tons. The two Turbine Gantry Cranes share rails common to all four units.

The Units 1 and 2 Turbine Gantry Crane is used almost exclusively on Units 1 and 2, and the Units 3 and 4 Turbine Gantry Crane is used almost exclusively on Units 3 and 4. Although infrequent, when the Units 1 and 2 Turbine Gantry Crane is used on Units 3 and 4, an evaluation is performed to ensure conformance with NUREG-0612. The Turbine Gantry Cranes are described in UFSAR Section 5I.3.

The Turbine Gantry Cranes are in the scope of license renewal because:

- They are non-safety related structures whose failure could prevent satisfactory accomplishment of required safety-related functions

A complete list of Turbine Gantry Cranes structural components requiring an aging management review and the component intended functions are provided in Table 3.6-18. The aging management review for the Turbine Gantry Cranes is discussed in Subsection 3.6.2.

2.4.2.17 TURKEY POINT UNITS 1 AND 2 CHIMNEYS

The Turkey Point Units 1 and 2 Chimneys, located directly north of Unit 3, do not perform any safety-related functions or directly protect safety-related equipment. However, these structures have been designed to not fail and cause an adverse interaction with any safety-related systems when subjected to the Class I seismic and wind loads. The Turkey Point Units 1 and 2 Chimneys are described in UFSAR Section 5A-1.4.2.

The Turkey Point Units 1 and 2 Chimneys are in the scope of license renewal because:

- They are non-safety related structures whose failure could prevent satisfactory accomplishment of required safety-related functions

A complete list of Turkey Point Units 1 and 2 Chimneys structural components requiring an aging management review and the component intended functions are provided in Table 3.6-19. The aging management review for the Turkey Point Units 1 and 2 Chimneys is discussed in Subsection 3.6.2.

2.4.2.18 YARD STRUCTURES

Yard Structures include concrete foundations for miscellaneous in-scope equipment and structures, concrete trenches for in-scope piping and utilities, and concrete duct banks and manholes for in-scope electrical systems that are not included within an

existing in-scope structure. Steel support structures (e.g., yard pipe supports) associated with the above described concrete structures were evaluated with the associated system. Yard Structures are shown in Figure 2.2-2.

The Yard Structures are in the scope of license renewal because they:

- Provide structural support to safety-related components
- Provide shelter/protection to safety-related components
- Provide structural support to non-safety related components whose failure could prevent satisfactory accomplishment of required safety-related functions
- Provide structural support to components relied on during certain postulated fire, anticipated transients without scram, and station blackout events
- Provide pipe whip restraint and/or jet impingement protection

A complete list of Yard Structures structural components requiring an aging management review and the component intended functions are provided in Table 3.6-20. The aging management review for Yard Structures is discussed in Subsection 3.6.2.

2.4.3 REFERENCES

2.4-1 NEI 95-10, "Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 – The License Renewal Rule," Revision 1, Nuclear Energy Institute, January 2000.

2.4-2 R. J. Hovey (FPL) letter to U. S. Nuclear Regulatory Commission, "Response to Generic Letter 98-04, Potential for Degradation of Emergency Core Cooling System and the Containment Spray System after a Loss-of-Coolant Accident because of Construction and Protective Coating Deficiencies and Foreign Material in Containment," L-98-272, November 9, 1998.

2.4-3 WCAP-14422, "License Renewal Evaluation: Aging Management for Reactor Coolant System Supports," Revision 2, March 1997.

2.4-4 C. I. Grimes (NRC) letter to R. A. Newton (WOG), "Draft Safety Evaluation Concerning the Westinghouse Owners Group License Renewal Evaluation: Aging Management for Reactor Coolant System Supports, WCAP-14422, Revision 2," February 25, 2000.

TABLE 2.4-1
REACTOR COOLANT SYSTEM SUPPORTS
APPLICANT ACTION ITEMS FROM SECTION 4.1 OF
WCAP-14422 DRAFT SAFETY EVALUATION

Renewal Applicant Action Item	Turkey Point-Specific Response
(1) The Westinghouse Owners Group did not clearly define the term "local" in its report. However, the aging management programs should be the same for all concrete structures and structural components, therefore, the license renewal applicants must describe the aging management program for adjacent concrete structures and any differences from the aging management program for the local concrete structures.	All concrete located inside Containment is addressed in the Containment aging management review with no distinction made between the local and adjacent concrete.
(2) A license renewal applicant will have to justify any differences between its Reactor Coolant System support system and the figures and descriptions of the supports systems contained in the Westinghouse Owners Group report.	The Turkey Point Reactor Coolant System support configurations are consistent with the configurations described in the generic technical report.
(3) A license renewal applicant will have to justify any differences between the materials used for its Reactor Coolant System supports and the values listed in Table 2-4 of the Westinghouse Owners Group report.	The materials used for the Turkey Point Reactor Coolant System supports are bounded by the materials specified in Table 2.4 of the generic technical report. Specifically, the materials of concern in the draft NRC Safety Evaluation, A7 and A36, are not used in any of the Turkey Point Reactor Coolant System supports.
(4) Recommendation from Section 5 of the Westinghouse Owners Group report: - Identification and evaluation of any plant-specific Time-Limited Aging Analyses applicable to their Reactor Coolant System supports. - Identification and evaluation of current-term programs implemented within the current licensing term to address technical issues from industry practices and United States Nuclear Regulatory Commission (NRC) directives [that] should be continued into the license renewal term. Modifications to or elimination of these programs have to be justified.	 - Plant-specific Time-Limited Aging Analyses are addressed in Chapter 4. - Current term programs do not deviate from the recommended aging management programs. None of the current term programs will be modified or eliminated for license renewal.

TABLE 2.4-1 (continued)
REACTOR COOLANT SYSTEM SUPPORTS
APPLICANT ACTION ITEMS FROM SECTION 4.1 OF
WCAP-14422 DRAFT SAFETY EVALUATION

Renewal Applicant Action Item	Turkey Point-Specific Response
Identification and justification of plant-specific programs that deviate from the recommended aging management programs.	- The only deviation from the recommended aging management programs identified in the generic technical report is in regard to AMP-1.3, " Stress Corrosion Cracking for Bolting." Based on the identified support bolting materials and environment, stress corrosion cracking of support bolting was eliminated as an aging effect requiring management at Turkey Point, as discussed in Section 3.6.
- Identification of any specific program necessary to ensure that proper preload is retained for the component supports within the scope of this report.	- Based on the Reactor Coolant System support materials and environment, creep and stress relaxation of bolting were eliminated as aging effects requiring management at Turkey Point, as discussed in Section 3.6.
- Identification of any evidence of aging degradation in inaccessible areas during the current licensing term that is considered to potentially affect system intended functions. A plan of action to address any identified potential degradation should be provided.	- The nozzle supports for the reactor vessel and the upper steam generator seismic ring are not currently inspected under Turkey Point's ASME Section XI inservice inspection (ISI) program. Based on results of inspections performed in 1987, reactor vessel supports showed no sign of aging. Therefore, no inspections beyond those Reactor Coolant System supports currently inspected under the ISI Program are warranted.
- Verification that the plant is bounded by this generic technical report. The actions applicants must take to verify that their plant is bounded will be described in an implementation procedure.	- Based on review of the Reactor Coolant System supports' configuration, operating environment, and materials, Turkey Point is bounded by the Reactor Coolant System Supports Generic Technical Report as described in Subsection 2.4.1.2. The actions taken to verify that the plant is bounded are described in Subsection 2.3.1.1.1. These actions are included in the aging management review implementing procedure.
Plant-specific evaluation of potential degradation due to irradiation of the components within the scope of this report.	- The potential for irradiation embrittlement of vessel supports external to the vessel was eliminated as an aging effect requiring management at Turkey Point, as discussed in Section 3.6.

TABLE 2.4-1 (continued)
REACTOR COOLANT SYSTEM SUPPORTS
APPLICANT ACTION ITEMS FROM SECTION 4.1 OF
WCAP-14422 DRAFT SAFETY EVALUATION

Renewal Applicant Action Item	Turkey Point-Specific Response
(5) The Westinghouse Owners Group report states that concrete degradation from irradiation will be addressed by plant-specific evaluation. The staff agrees with this suggestion and the license renewal applicant must develop plant-specific program(s) to evaluate this concern.	The Turkey Point neutron fluence levels and maximum integrated gamma doses were evaluated. Based on this evaluation, concrete degradation due to irradiation was eliminated as an aging effect requiring management at Turkey Point, as discussed in Section 3.6.
(6) The attributes of the aging management programs provided in the Westinghouse Owners Group report do not address all elements as listed in Section 3.0.I.C of the standard review plan for license renewal. The applicants should address the missing review elements and describe the plant-specific experience, if any, related to aging degradation of the Reactor Coolant System supports in their applications.	All elements listed in Subsection 3.0.I.C of the standard review plan for license renewal are addressed in the Turkey Point aging management programs, as described in Appendix B.
(7) A license renewal applicant must provide the necessary details to perform leakage identification walkdowns and the details of the leakage monitoring program(s), especially the frequencies, for Aging Management Program 1-1 and Aging Management Program 1-2.	Leakage identification walkdowns and leakage monitoring for Aging Management Programs 1-1, "Aggressive Chemical Attack and Corrosion for Steel," and 1-2, "Aggressive Chemical Attack and Corrosion for Concrete Embedments," are addressed by the Turkey Point Boric Acid Wastage Surveillance Program. The details of the Boric Acid Wastage Surveillance Program are provided in Appendix B.
(8) All structures and structural components need a baseline inspection to document the condition of the structures and structural components. Therefore, the renewal applicants will have to have plant-specific baseline inspection results for all structures and structural components, or a planned inspection to obtain such results and validate the aging management programs prior to entering the period of extended operation.	Baseline inspections are used as the baseline condition against which all future inspections are compared. Baseline inspections are generally performed when there are no existing, documented inspection results. Although not characterized as "baseline inspections" at the time they were performed, inspections that serve as baseline inspections have been performed and documented for the Reactor Coolant System supports under the In-service Inspection Program.
(9) In accordance to the Westinghouse Owners Group report, leakage walkdowns and monitoring are plant-specific. Therefore, a license renewal applicant will have to provide the necessary qualitative or quantitative acceptance criteria for leakage walkdowns and monitoring.	Leakage walkdowns and monitoring are included in the Turkey Point Boric Acid Wastage Surveillance Program. The details of the Boric Acid Wastage Surveillance Program are provided in Appendix B.

TABLE 2.4-2
REACTOR COOLANT SYSTEM SUPPORTS
OPEN ITEMS FROM SECTION 4.2 OF
WCAP-14422 DRAFT SAFETY EVALUATION

Open Item	Turkey Point-Specific Response
(1) The Westinghouse Owners Group report contains many discrepancies and omissions:	
- Wear plates and bearing pads are included as support components and are within the scope of this Westinghouse Owners Group report but are not identified in Table 2-1 as parts and sub-components requiring an aging management review.	- These items should be included in the generic technical report table. The aging effect evaluation for these items is included in Section 3.2.5 of the generic technical report and is consistent with the Turkey Point aging management review discussed in Subsection 3.6.1.5.
- Sketches of Reactor Coolant Pump support configuration 4 and Pressurizer support configuration 2 are not provided in the Westinghouse Owners Group report.	- These sketches could be added to the generic technical report for clarity but have no bearing on the Turkey Point aging management review since the Turkey Point reactor coolant pump supports are consistent with configuration 5 of the generic technical report.
- Section 3.2.9 of the Westinghouse Owners Group report indicates that ASTM A36 steel is used in Steam Generator and Reactor Coolant Pump supports, however, ASTM A36 steel is not included in the list of material for the primary component supports (Table 2-4).	- ASTM A36 steel is not used in steam generator and reactor coolant pump supports at Turkey Point. The only place where A36 steel is used in Reactor Coolant System supports at Turkey Point is in the Pressurizer Surge Line support.
- The 1963 AISC manual (Ref. 3) states that the following steel materials are commonly used for steel construction but they are not listed in Table 2-4 of the Westinghouse Owners Group report. They are ASTM A7, A36, A242, A373, A440, and A441 structural steel and ASTM A325 bolts.	- The Turkey Point aging management review identifies which materials are used in Reactor Coolant System supports. ASTM A36, A440, A441, and A325 materials are used in Reactor Coolant System supports at Turkey Point and these materials were evaluated in the Turkey Point aging management review described in Subsection 3.6.1.5. Based on Turkey Point's review, consideration of these materials in the aging management review presented in the generic technical report will not affect the conclusions reached.
- There are no specific descriptions and sketches for the pressurizer surge line supports.	- The surge line in each unit has a typical deadweight spring can trapeze assembly to counter the deadweight loads. In addition, there are three (3) whip restraints per line.

TABLE 2.4-2 (continued)
REACTOR COOLANT SYSTEM SUPPORTS
OPEN ITEMS FROM SECTION 4.2 OF
WCAP-14422 DRAFT SAFETY EVALUATION

Open Item	Turkey Point-Specific Response
(2) Temper embrittlement and strain aging embrittlement are the most common forms of thermal embrittlement that are seen in ferritic materials as stated in Section 3.2.4 of the Westinghouse Owners Group report. The Westinghouse Owners Group report has determined that temper embrittlement is not a concern for the ferritic materials of Reactor Coolant System supports. However, the Westinghouse Owners Group report does not address the aging effects from strain aging embrittlement but states that thermal embrittlement is not applicable. Westinghouse Owners Group should discuss the applicability of the aging effects caused by strain aging embrittlement to the Reactor Coolant System support components.	The generic technical report treats 'temper embrittlement' and 'strain aging embrittlement' as one mechanism called 'thermal aging embrittlement.' The generic technical report conclusion that thermal aging embrittlement is not applicable is meant to include temper embrittlement and strain aging embrittlement. The Turkey Point aging management review is consistent with that conclusion.

TABLE 2.4-2 (continued)
REACTOR COOLANT SYSTEM SUPPORTS
OPEN ITEMS FROM SECTION 4.2 OF
WCAP-14422 DRAFT SAFETY EVALUATION

Open Item	Turkey Point-Specific Response
(3) Appendix C of NUREG-0577 addresses this item and groups many Westinghouse Owners Group member plants as Group I "plants requiring further evaluation." Although Table 3.9-3 of SRP-LR and Table B9 of NUREG-1557 indicated that "low fracture toughness is not significant for containment internal structures," in general, these two documents only addressed the containment internal structures as a whole and did not specifically address the Reactor Coolant System support components. Westinghouse Owners Group recognizes this concern and states in Section 3.2.9 of its report that "Utilities with potential problems were required to demonstrate that the suspect structures have adequate fracture toughness to comply with the criteria defined in NUREG-0577." However, it further states that "low fracture toughness does not cause detrimental aging effects that must be addressed by maintenance programs." The staff does not believe that the Westinghouse Owners Group report provides sufficient information to support this conclusion. Westinghouse Owners Group should confirm that its member plants listed as Group I in Appendix C of NUREG-0577 have performed the recommended evaluations in accordance with NUREG-0577 to demonstrate that the steel components of their Reactor Coolant System supports have sufficient fracture toughness to perform their intended functions.	Turkey Point is not identified as a Group 1 plant in Appendix C of NUREG-0577, Revision 1. In addition, the NUREG states that, "...a risk evaluation was performed and the results incorporated in a value-impact analysis..." and concludes, "...requirements to certify the acceptability of material or design also should not be imposed. Such action would provide no safety benefit...." Therefore, plants were not required to demonstrate that steel components of the Reactor Coolant System supports have sufficient fracture toughness to perform their intended functions.

TABLE 2.4-2 (continued)
REACTOR COOLANT SYSTEM SUPPORTS
OPEN ITEMS FROM SECTION 4.2 OF
WCAP-14422 DRAFT SAFETY EVALUATION

Open Item	Turkey Point-Specific Response
(4) The Westinghouse Owners Group report states that concrete operating temperature should not exceed 150°F and local area temperature should be kept under 200°F. The Westinghouse Owners Group report further states that reactor pressure vessel supports could be subjected to high temperatures that could potentially result in a local temperature above 200°F if supplemental cooling is not provided. For those support configurations where the local temperature at concrete surfaces could exceed 200°F, special design features are incorporated based on air or water cooling to keep local temperature below 200°F. These temperatures are specified in the ASME Code. Therefore, elevated temperature is not a concern for concrete. Because the operating temperature of concrete components are kept below the limits specified by the code by means of supplemented cooling, the staff considers that the aging effects of elevated temperature are applicable to the Reactor Coolant System supports and are being managed by supplemented cooling features. The Westinghouse Owners Group report should indicate that the aging effects associated with elevated temperatures are applicable and requires that applicants for license renewal demonstrate that existing design features are capable of preventing any unacceptable degradation during the extended period of operation.	Cracking due to elevated temperature is not an aging effect requiring management since concrete temperatures are below American Concrete Institute (ACI) code thresholds due to normal containment and cooling. The Normal Containment and Control Rod Drive Mechanism Cooling System is in the scope of license renewal and will be operated consistent with current operations during the period of extended operation. Failure of the Normal Containment and Control Rod Drive Mechanism Cooling System would be event related and would require plant actions to restore for long-term continued power operations.

TABLE 2.4-2 (continued)
REACTOR COOLANT SYSTEM SUPPORTS
OPEN ITEMS FROM SECTION 4.2 OF
WCAP-14422 DRAFT SAFETY EVALUATION

Open Item	Turkey Point-Specific Response
(5) AMP-1.2 specifies inspection frequency in accordance with the requirements of Subsection IWF-2410 (Inspection Program) and Table IWB-2412-1, each 10-year interval following the first interval, 10-year inspection program, with IWB-2412. The staff considers the frequency proposed by Westinghouse Owners Group not to be adequate. The proposed frequency is in accordance with ASME standards, but the inspections are to the requirements of ACI Standards, therefore, the frequency of inspection should also follow the recommendations of the ACI standards. Inspection frequencies recommended by ACI 349.3R-96 are every 10 years for below grade structures and controlled interiors and every 5 years for all other structures. Section 4.2.4.1 of NUREG/CR-6424 has the same recommendation for inspection frequencies. The Westinghouse Owners Group should revise the inspection frequency of AMP-1.2 to that recommended by ACI 349.3R-96.	The Turkey Point aging management review identified two aging management programs for concrete embedments. These are the Boric Acid Wastage Surveillance Program for boric acid leaks and the Systems and Structures Monitoring Program for managing general loss of material and change in material properties. Both aging management programs, described in Appendix B, meet or exceed the frequencies recommended in ACI 349.3R.

TABLE 2.4-2 (continued)
REACTOR COOLANT SYSTEM SUPPORTS
OPEN ITEMS FROM SECTION 4.2 OF
WCAP-14422 DRAFT SAFETY EVALUATION

Open Item	Turkey Point-Specific Response
(6) AMP-1.2 specifies acceptance criteria in accordance with several ACI standards. These ACI standards are ACI 201.2R-77, ACI224.1R-89, and ACI 224R-89. The staff has reviewed these ACI standards and concluded that, except for ACI 224.1R, they are mainly for design and construction rather than aging effects management because those concrete properties are built-in by design and construction. However, they do contain attributes that can be used to develop inspection acceptance criteria for AMP-1.2. For leakage walkdowns and leakage monitoring, the acceptance criteria are the same as that listed for AMP-1.1. The staff has also reviewed ACI 349.3R-96, which is referenced in the Westinghouse Owners Group report for surveillance technique, and concluded it has acceptance criteria that can be modified and used as the inspection acceptance criteria for AMP-1.2. These criteria include acceptance without further evaluation, acceptance after review, and conditions requiring further evaluation. Therefore, the staff considers that Westinghouse Owners Group, as a minimum, should provide a description of the inspection acceptance criteria similar to that of ACI 349.3R-96.	The Systems and Structures Monitoring Program acceptance criteria, described in Appendix B, incorporate the requirements of AMP-1.2.

2.5 SCOPING AND SCREENING RESULTS - ELECTRICAL AND INSTRUMENTATION AND CONTROLS (I&C)

The methodology used in identifying electrical/I&C components requiring an aging management review is discussed in Subsection 2.1.2.3. The screening for electrical/ I&C components was performed on a generic component commodity group basis for the in-scope electrical/I&C systems listed in Table 2.2-3, as well as the electrical/I&C component commodity groups associated with in-scope mechanical systems and civil structures listed in Tables 2.2-1 and 2.2-2. The methodology employed is consistent with the guidance in NEI 95-10 [Reference 2.5-1].

The interface of electrical/I&C components with other types of components and the assessments of these interfacing components are provided in the appropriate mechanical or civil/structural sections. For example, the assessment of electrical racks, panels, frames, cabinets, cable trays, conduit, and their supports is provided in the civil/structural assessment documented in Sections 2.4 and 3.6.

The electrical/I&C components included in the screening were the separate electrical/I&C components that were not parts of larger components. For example, the wiring, terminal blocks, and connections located internal to a breaker cubicle were considered to be parts of the breaker. Accordingly, the breaker was screened, but not the internal parts.

2.5.1 ELECTRICAL/I&C COMPONENT COMMODITY GROUPS

The electrical/I&C component commodity groups were identified from a review of controlled drawings, the plant equipment database, and interface with the parallel mechanical and civil/structural screening efforts. The in-scope electrical/I&C component commodity groups identified at Turkey Point Units 3 and 4 are listed in Table 2.5-1. This list includes all electrical/I&C component commodity groups listed in Appendix B of NEI 95-10 [Reference 2.5-1], with the exception of the following component commodity groups that were eliminated from consideration based on plant level scoping:

- **Electrical Bus** - The isolated-phase buses and switchyard buses are not relied on to meet the license renewal scoping requirements of 10 CFR 54.4(a).
- **Transmission Conductors** - Transmission conductors are not relied on to meet the license renewal scoping requirements of 10 CFR 54.4(a).
- **High Voltage Insulators** - High voltage insulators are not relied on to meet the license renewal scoping requirements of 10 CFR 54.4(a).

No additional component commodity groups, beyond those listed in Appendix B of NEI 95-10, were identified.

2.5.2 APPLICATION OF SCREENING CRITERION 10 CFR 54.21(a)(1)(i) TO ELECTRICAL/I&C COMPONENT COMMODITY GROUPS

Following the identification of the electrical/I&C component commodity groups, the criterion of 10 CFR 54.21(a)(1)(i) was applied to identify component commodity groups that perform their intended function passively. This evaluation was performed utilizing the guidance of 10 CFR 54.21(a)(1)(i) and NEI 95-10 [Reference 2.5-1].

The following electrical/I&C component commodity groups were determined to meet the screening criterion of 10 CFR 54.21(a)(1)(i) and were further evaluated against the criterion of 10 CFR 54.21(a)(1)(ii):

- Insulated Cables and Connections (including splices, connectors, and terminal blocks)
- Uninsulated Ground Conductors
- Electrical/I&C Penetration Assemblies

2.5.3 APPLICATION OF SCREENING CRITERION 10 CFR 54.21(a)(1)(ii) TO SPECIFIC ELECTRICAL/I&C COMPONENT COMMODITY GROUPS

10 CFR 54.21(a)(1)(ii) allows the exclusion of those component commodity groups that are subject to replacement based on a qualified life or specified time period. The 10 CFR 54.21(a)(1)(ii) screening criterion was applied to the specific component commodity groups that were included by application of the 10 CFR 54.21(a)(1)(i) criterion. The results of this review are discussed below.

2.5.3.1 INSULATED CABLES AND CONNECTIONS

The function of insulated cables and connections is to electrically connect specified sections of an electrical circuit to deliver voltage, current, or signals. Electrical cables and their required terminations (i.e., connections) are reviewed as a single component commodity group. The types of connections included in this review are splices, connectors, and terminal blocks. Numerous insulated cables and connections are included in the Environmental Qualification Program. The insulated cables and connections that are included in this program have a qualified life that is documented in the Environmental Qualification Program. Components in the Environmental Qualification Program are replaced by the end of the qualified life. Accordingly, all insulated cables and connections within the Environmental Qualification Program are replacement items under 10 CFR 54.21(a)(1)(ii) and are not subject to an aging management review. Note that Time-Limited Aging Analyses associated with electrical/I&C components within the Environmental Qualification Program are discussed in Subsection 4.4.1.

Insulated cables and connections that perform an intended function within the scope of license renewal, but are not included in the Environmental Qualification Program, meet the criterion of 10 CFR 54.21(a)(1)(ii) and are subject to an aging management review.

2.5.3.2 UNINSULATED GROUND CONDUCTORS

Uninsulated ground conductors are electrical/I&C conductors that are uninsulated (bare) and are used to make ground connections for electrical/I&C equipment. Uninsulated ground conductors are connected to electrical/I&C equipment housings and electrical/I&C enclosures as well as metal structural features, such as the cable

tray system and building structural steel. Uninsulated ground conductors are isolated or insulated from the electrical/I&C operating circuits.

Uninsulated ground conductors are relied upon in safety analyses and plant evaluations at Turkey Point to perform a function that demonstrates compliance with the Commission's regulations for fire protection. Uninsulated ground conductors meet the criterion of 10 CFR 54.21(a)(1)(ii) and are subject to an aging management review.

2.5.3.3 ELECTRICAL/I&C PENETRATION ASSEMBLIES

Electrical/I&C penetration assemblies included in the Environmental Qualification Program have a qualified life that is documented. Therefore, electrical/I&C penetration assemblies in the Environmental Qualification Program do not meet the criterion of 10 CFR 54.21(a)(1)(ii) and are not subject to an aging management review.

A review of the electrical/I&C penetrations determined that in addition to the electrical/I&C penetration assemblies included in the Environmental Qualification Program, an additional eleven (2 power / 9 instrumentation & control) electrical/I&C penetration assemblies on each unit were determined to support SCs inside containment that are in the scope of license renewal. The twenty-two electrical/I&C penetration assemblies that are in the scope of license renewal, but not included in the Environmental Qualification Program, meet the criterion of 10 CFR 54.21(a)(1)(ii) and are subject to an aging management review.

2.5.4 ELECTRICAL/I&C COMPONENTS REQUIRING AN AGING MANAGEMENT REVIEW

The electrical and I&C component commodity groups subject to an aging management review include:

- Insulated Cables and Connections (including splices, connectors, and terminal blocks and splices) not included in the Environmental Qualification Program
- Uninsulated Ground Conductors
- Twenty-two electrical/I&C penetration assemblies that are in the scope of license renewal but not included in the Environmental Qualification Program

The intended function for the electrical and I&C component commodity groups subject to an aging management review is to electrically connect specified sections of an electrical circuit to deliver voltage, current, or signals. A complete list of electrical and I&C component commodity groups requiring an aging management review and the component commodity group intended functions are provided in Table 3.7-5. The aging management review for electrical and I&C component commodity groups is discussed in Section 3.7.

2.5.5 REFERENCES

2.5-1 NEI 95-10, "Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 – The License Renewal Rule," Revision 1, Nuclear Energy Institute, January 2000.

TABLE 2.5-1
ELECTRICAL/I&C COMPONENT COMMODITY GROUPS

ELECTRICAL/I&C COMPONENT COMMODITY GROUPS INSTALLED AT TURKEY POINT FOR IN-SCOPE SYSTEMS AND STRUCTURES			
Alarm units	Circuit breakers	Fuses	Signal conditioners
Analyzers	Communication equipment	Generators/motors	Solenoid operators
Annunciators		Heat tracing	Solid-state devices
Batteries	Electrical/I&C controls and panel internal component assemblies	Heaters	Surge arresters
Cables and connections (terminal blocks, connectors, and splices) Bus - insulated cables and connectors		Indicators	Switches
		Isolators	Switchgear Motor control centers Power distribution panels
		Light bulbs	
		Loop controllers	
Cables and connections (terminal blocks, connectors, and splices) Bus - uninsulated ground cables	Electrical/I&C penetration assemblies	Meters	Transformers
		Power supplies	
		Radiation monitors	Transmitters
Chargers Converters Inverters	Elements Resistance temperature detectors (RTDs) Sensors Thermocouples Transducers	Recorders	
		Regulators	
		Relays	