
Safety Evaluation Report

Related to the License Renewal of
Turkey Point Nuclear Plant, Units 3 and 4

Docket Nos. 50-250 and 50-251

Florida Power & Light Company

U.S. Nuclear Regulatory Commission

Office of Nuclear Reactor Regulation

February 2002



THIS PAGE IS INTENTIONALLY LEFT BLANK

ABSTRACT

This document is a safety evaluation report regarding the application to renew the operating licenses for Turkey Point Nuclear Plant, Units 3 and 4, which was filed by the Florida Power and Light Company by letter dated September 8, 2000, and received by the U.S. Nuclear Regulatory Commission (NRC) on September 11, 2000. The NRC's Office of Nuclear Reactor Regulation has reviewed the Turkey Point license renewal application for compliance with the requirements of Title 10 of the *Code of Federal Regulations*, Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," and prepared this report to document its findings.

In its submittal of September 8, 2000, the Florida Power and Light Company requested renewal of the operating license for Turkey Point, Units 3 and 4 (License Nos. DPR-31 and DRP-41, respectively), which were issued under Section 104b of the Atomic Energy Act of 1954, as amended, for a period of 20 years beyond the current license expiration dates of July 19, 2012, and April 10, 2013, respectively. Turkey Point Units 3 and 4 are located in Miami-Dade County east of Florida City, Florida. Each unit consists of a Westinghouse pressurized-water reactor nuclear steam supply system designed to produce a core thermal power of 2,300 megawatts or approximately 693 net megawatts electric.

The NRC's project manager for the Turkey Point license renewal is Rajender Auluck. Dr. Auluck may be contacted by calling 301-415-1025 or by writing to the License Renewal and Environmental Impacts, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

THIS PAGE IS INTENTIONALLY LEFT BLANK

CONTENTS

ABSTRACT	iii
1 INTRODUCTION AND GENERAL DISCUSSION	1-1
1.1 Introduction	1-1
1.2 License Renewal Background	1-2
1.2.1 Safety Reviews	1-3
1.2.2 Environmental Reviews	1-4
1.3 Summary of Principal Review Matters	1-5
1.3.1 Westinghouse Topical Reports	1-6
1.4 Resolution of Open Items and Confirmatory Items	1-7
2 STRUCTURES AND COMPONENTS SUBJECT TO AN AGING MANAGEMENT REVIEW	2-1
2.1 Scoping and Screening Methodology	2-1
2.2 Plant Level Scoping Results	2-17
2.3 System Scoping and Screening Results-mechanical Systems	2-19
2.3.1 Reactor Coolant Systems (Rcs)	2-19
2.3.1.1 Westinghouse Owners Group Generic Technical Reports	2-21
2.3.1.2 Reactor Coolant Piping	2-23
2.3.1.3 Regenerative and Excess Letdown Heat Exchangers	2-25
2.3.1.4 Pressurizers	2-26
2.3.1.5 Reactor Vessels	2-28
2.3.1.6 Reactor Vessel Internals	2-29
2.3.1.7 Reactor Coolant Pumps	2-31
2.3.1.8 Steam Generators	2-32
2.3.2 Engineered Safety Features Systems	2-34

2.3.2.1	Emergency Containment Cooling	2-35
2.3.2.2	Containment Spray System	2-36
2.3.2.3	Containment Isolation	2-38
2.3.2.4	Safety Injection	2-39
2.3.2.5	Residual Heat Removal	2-41
2.3.2.6	Emergency Containment Filtration	2-42
2.3.2.7	Containment Post-Accident Monitoring and Control	2-44
2.3.3	Auxiliary Systems	2-47
2.3.3.1	Intake Cooling Water	2-47
2.3.3.2	Component Cooling Water	2-48
2.3.3.3	Spent Fuel Pool Cooling	2-50
2.3.3.4	Chemical and Volume Control	2-52
2.3.3.5	Primary Water Makeup	2-55
2.3.3.6	Sample Systems	2-56
2.3.3.7	Waste Disposal	2-58
2.3.3.8	Instrument Air	2-60
2.3.3.9	Normal Containment and Control Rod Drive Mechanism Cooling	2-62
2.3.3.10	Auxiliary Building Ventilation	2-64
2.3.3.11	Control Building Ventilation	2-70
2.3.3.12	Emergency Diesel Generator Building Ventilation	2-79
2.3.3.13	Turbine Building Ventilation System	2-84
2.3.3.14	Fire Protection System	2-88
2.3.3.15	Emergency Diesel Generators and Support Systems	2-93
2.3.4	Steam and Power Conversion Systems	2-96

2.4 Scoping And Screening Results-structures	2-102
2.4.1 Containment	2-102
2.4.1.1 Containment Structure	2-102
2.4.1.2 Containment Internal Structural Components	2-106
2.4.2 Other Structures	2-110
2.4.2.1 Auxiliary Building	2-110
2.4.2.2 Cold Chemistry Laboratory	2-112
2.4.2.3 Control Building	2-113
2.4.2.4 Cooling Water Canals	2-115
2.4.2.5 Diesel-Driven Fire Pump Enclosure	2-116
2.4.2.6 Discharge Structure	2-117
2.4.2.7 Electrical Penetration Rooms	2-119
2.4.2.8 Emergency Diesel Generator Buildings	2-121
2.4.2.9 Fire Protection Monitoring Station	2-123
2.4.2.10 Fire-Rated Assemblies	2-124
2.4.2.11 Intake Structure	2-125
2.4.2.12 Main Steam and Feedwater Platforms	2-127
2.4.2.13 Plant Vent Stack	2-128
2.4.2.14 Spent Fuel Storage and Handling	2-129
2.4.2.15 Turbine Building	2-131
2.4.2.16 Turbine Gantry Cranes	2-133
2.4.2.17 Turkey Point Units 1 and 2 Chimneys	2-135
2.4.2.18 Yard Structures	2-137
2.5 Scoping and Screening Results-electrical And Instrumentation and Controls (I&C)	2-139

3	AGING MANAGEMENT REVIEW RESULTS	3-1
3.1	Common Aging Management Programs	3-1
3.1.1	Chemistry Control Program	3-1
3.1.2	FPL Quality Assurance Program	3-6
3.1.3	Systems and Structural Monitoring Program	3-11
3.2	Reactor Coolant Systems	3-17
3.2.1	Reactor Coolant Piping	3-17
3.2.1.1	Class 1 Piping	3-17
3.2.1.2	Non-Class 1 Piping	3-21
3.2.2	Regenerative and Excess Letdown Heat Exchangers	3-25
3.2.3	Pressurizers	3-30
3.2.4	Reactor Vessels	3-38
3.2.5	Reactor Vessel Internals	3-43
3.2.6	Reactor Coolant Pumps	3-53
3.2.7	Steam Generators	3-62
3.3	Engineered Safety Features Systems	3-66
3.3.1	Emergency Containment Cooling System	3-67
3.3.2	Containment Spray	3-70
3.3.3	Containment Isolation	3-73
3.3.4	Safety Injection	3-77
3.3.5	Residual Heat Removal	3-81
3.3.6	Emergency Containment Filtration	3-83
3.3.7	Containment Post-Accident Monitoring and Control	3-86
3.4	Auxiliary Systems	3-88
3.4.1	Intake Cooling Water	3-89

3.4.2	Component Cooling Water	3-94
3.4.3	Spent Fuel Pool Cooling	3-98
3.4.4	Chemical and Volume Control	3-101
3.4.5	Primary Water Makeup	3-106
3.4.6	Sample Systems	3-108
3.4.7	Waste Disposal	3-110
3.4.8	Instrument Air	3-111
3.4.9	Normal Containment and Control Rod Drive Mechanism Cooling	3-112
3.4.10	Auxiliary Building Ventilation and Electrical Equipment Room Ventilation	3-114
3.4.11	Control Building Ventilation	3-115
3.4.12	Emergency Diesel Generator Building Ventilation	3-119
3.4.13	Turbine Building Ventilation	3-121
3.4.14	Fire Protection	3-125
3.4.15	Emergency Diesel Generators and Support Systems	3-131
3.4.16	General	3-135
3.4.16.1	Thermal Fatigue	3-135
3.4.16.2	Mechanical Closure Integrity	3-136
3.4.16.3	Ventilation Systems Flexible Connectors	3-136
3.4.16.4	Scoping Issues Related to Aging Management Programs for Auxiliary Systems	3-137
3.5	Steam and Power Conversion Systems	3-139
3.6	Structures and Structural Components	3-144
3.6.1	Containments	3-144
3.6.1.1	Containment Structure Concrete Components	3-144
3.6.1.2	Containment Structure Steel Components	3-147

3.6.1.3	Containment Structure Post-Tensioning System	3-151
3.6.1.4	Containment Internal Structural Concrete Components	3-152
3.6.1.5	Containment Internal Structural Steel Components	3-155
3.6.2	Other Structures	3-158
3.6.2.1	Steel-in-Air Structural Components	3-158
3.6.2.2	Steel-in-Fluid Structural Components	3-161
3.6.2.3	Concrete Structural Components	3-164
3.6.2.4	Miscellaneous Structural Components	3-167
3.7	Electrical and Instrumentation and Controls	3-170
3.8	New Aging Management Programs	3-183
3.8.1	Auxiliary Feedwater Pump Oil Coolers Inspection Program	3-183
3.8.2	Auxiliary Feedwater Steam Piping Inspection Program	3-186
3.8.3	Emergency Containment Coolers Inspection	3-189
3.8.4	Field-Erected Tanks Internal Inspection	3-192
3.8.5	Galvanic Corrosion Susceptibility Inspection Program	3-196
3.8.6	Reactor Vessel Internals Inspection Program	3-199
3.8.6.1	Visual Examination	3-200
3.8.6.2	Ultrasonic Examination	3-201
3.8.7	Small Bore Class 1 Piping Inspection	3-203

3.9 Existing Aging Management Programs	3-205
3.9.1 ASME Section XI Inservice Inspection Programs	3-205
3.9.1.1 ASME Section XI, Subsections IWB, IWC, and IWD Inservice Inspection Program	3-206
3.9.1.2 ASME Section XI, Subsection IWE Inservice Inspection Program	3-209
3.9.1.3 ASME Section XI, Subsection IWF Inservice Inspection Program	3-212
3.9.1.4 ASME Section XI, Subsection IWL Inservice Inspection Program	3-215
3.9.2 Boraflex Surveillance Program	3-218
3.9.3 Boric Acid Wastage Surveillance Program	3-222
3.9.4 Chemistry Control Program	3-225
3.9.5 Containment Spray System Piping Inspection Program	3-226
3.9.6 Environmental Qualification Program	3-229
3.9.7 Fatigue Monitoring Program	3-232
3.9.8 Fire Protection Program	3-233
3.9.9 Flow-Accelerated Corrosion Program	3-238
3.9.10 Intake Cooling Water System Inspection Program	3-241
3.9.11 Periodic Surveillance and Preventive Maintenance Program	3-246
3.9.12 Reactor Vessel Head Alloy 600 Penetration Inspection Program	3-249
3.9.13 Reactor Vessel Integrity Program	3-252
3.9.13.1 Reactor Vessel Surveillance Capsule Removal and Evaluation	3-253
3.9.13.2 Fluence and Uncertainly Calculations	3-255
3.9.13.3 Monitoring Effective Full Power Years	3-258
3.9.13.4 Pressure - Temperature Limit Curves	3-260
3.9.14 Steam Generator Integrity Program	3-261
3.9.15 Systems and Structures Monitoring Program	3-263

3.9.16	Thimble Tube Inspection Program	3-264
4	TIME-LIMITED AGING ANALYSES	4-1
4.1	Identification of Time-limited Aging Analyses	4-1
4.2	Reactor Vessel Irradiation Embrittlement	4-1
4.3	Metal Fatigue	4-9
4.4	Environmental Qualification	4-20
4.5	Containment Tendon Loss of Prestress	4-30
4.6	Containment Liner Plate Fatigue	4-33
4.7	Other Plant-specific Time-limited Aging Analyses	4-36
4.7.1	Bottom Mounted Instrumentation Thimble Tube Wear	4-36
4.7.2	Emergency Containment Cooler Tube Wear	4-38
4.7.3	Leak-Before-Break for Reactor Coolant System Piping	4-39
4.7.4	Crane Load Cycle Limits	4-41
5	REVIEW BY THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS	5-1
6	CONCLUSIONS	6-1
	Appendix A: CHRONOLOGY	A-1
	Appendix B: REFERENCES	B-1
	Appendix C: ABBREVIATIONS	C-1
	Appendix D: PRINCIPAL CONTRIBUTORS	D-1

5. REVIEW BY THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

During the meeting of the Advisory Committee on Reactor Safeguards (ACRS) on October 5, 2001, the ACRS reviewed the NRC staff's safety evaluation report (SER) related to the license renewal application (LRA) for the Turkey Point Nuclear Plant, Units 3 and 4. The ACRS Subcommittee on Plant License Renewal initially reviewed the SER prior to its meeting with the NRC staff and the applicant on September 25, 2001, and presented its findings during the October 5, 2001, ACRS meeting.

Due to the small number and subject matter of open items, the subcommittee recommended not issuing an interim letter on its review of the license renewal SER with open items. The ACRS subcommittee meeting to review the final SER is scheduled for March 13, 2002, and the ACRS full committee meeting to review the final SER is scheduled for April 12, 2002.

THIS PAGE IS INTENTIONALLY LEFT BLANK

6. CONCLUSIONS

The staff reviewed the license renewal application for Turkey Point Nuclear Plant, Units 3 and 4, in accordance with Commission's regulations and the NRC's draft "Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants," dated August 2000. The revised SRP was issued as NUREG-1800 in July 2001. 10 CFR 54.29 identifies the standards for issuance of a renewed license.

On the basis of its evaluation of the application as discussed above, the staff has determined that the requirements of 10 CFR 54.29(a) have been met.

The staff notes that any requirements of Subpart A of 10 CFR Part 51 are documented in the final plant-specific supplement to the Generic Environmental Impact Statement, dated January 2002.

THIS PAGE IS INTENTIONALLY LEFT BLANK

APPENDIX A CHRONOLOGY

This appendix contains a chronological listing of routine licensing correspondence between the U.S. Nuclear Regulatory Commission (NRC) staff and Florida Power & Light Company (FPL) and other correspondence regarding the NRC staff's review of the Turkey Point Nuclear Plant, Units 3 and 4 (under Docket Nos. 50-250 and 50-251) for license renewal application (LRA).

- | | |
|--------------------|---|
| September 8, 2000 | In a letter (signed by T. Plunkett), FPL submitted its LRA for Turkey Point Nuclear Plant, Units 3 and 4, as well as a copy of the boundary drawings to the NRC. |
| September 19, 2000 | In a letter (signed by C. Grimes), NRC informed FPL that the NRC received the Turkey Point Nuclear Plant, Units 3 and 4, LRA on September 11, 2000, and that Mr. Rajender Auluck was appointed as the project manager for the Turkey Point Nuclear Plant, Units 3 and 4, LRA. |
| October 4, 2000 | In a letter (signed by D. Mathews), NRC informed FPL that the NRC staff has determined that FPL has submitted sufficient information that is complete and acceptable for docketing, proposed review schedule, and opportunity for hearing. |
| November 1, 2000 | In a meeting summary (signed by R. Auluck), NRC summarized the meeting held to familiarize the NRC staff with the Turkey Point Nuclear Plant, Units 3 and 4, LRA. |
| December 22, 2000 | In a letter (signed by R. Auluck), NRC requested that FPL provide additional information (RAI) on Sections 2.3.3.10 – 12 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA. |
| December 22, 2000 | In a meeting summary (signed by R. Auluck), NRC summarized the October 31, 2000, meeting with FPL regarding review of equipment qualification (EQ) calculations for the Turkey Point Nuclear Plant, Units 3 and 4, LRA. |
| January 10, 2001 | In a letter (signed by R. Auluck), NRC requested that FPL provide additional information (RAI) on Sections 2.3.4 and 3.5 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA. |
| January 17, 2001 | In a letter (signed by R. Auluck), NRC requested that FPL provide additional information (RAI) on Sections 3.7, 4.4, and Appendix B, 3.2.6 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA. |
| January 17, 2001 | In a letter (signed by R. Auluck), NRC requested that FPL provide additional information (RAI) on Sections 2.3.3.8, 2.4.2.8, and 2.4.2.10 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA. |

January 19, 2001	In a letter (signed by R. Hovey), FPL provided its response to the NRC RAIs on Sections 2.3.3.10 - 12 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on December 22, 2000.
January 24, 2001	In a letter (signed by R. Auluck), NRC requested that FPL provide additional information (RAI) on Section 2.3.3.14 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA.
January 31, 2001	In a letter (signed by J. Wilson), NRC requested FPL provide additional information (RAI) regarding severe accident mitigation alternatives for Turkey Point Nuclear Plant, Units 3 and 4.
February 1, 2001	In a letter (signed by S. Koenick), NRC requested that FPL provide additional information (RAI) on Sections 4.2, 4.7.1 and Appendix B Sections 3.1.5, 3.1.6, 3.1.7, 3.2.1.1, 3.2.2, 3.2.3, 3.2.4, 3.2.9, 3.2.11, 3.2.12, 3.2.13, 3.2.14, and 3.2.16 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA.
February 2, 2001	In a letter (signed by R. Auluck), NRC requested that FPL provide additional information (RAI) on Sections 2.1, 2.3.1, 2.3.2.2, 2.3.3.3, 2.3.3.4, 2.4.1, and 2.4.2.4 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA.
February 2, 2001	In a letter (signed by R. Auluck), NRC requested that FPL provide additional information (RAI) on Section 3.2 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA.
February 2, 2001	In a letter (signed by R. Auluck), NRC requested that FPL provide additional information (RAI) on Section 3.3 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA.
February 2, 2001	In a letter (signed by R. Auluck), NRC requested that FPL provide additional information (RAI) on Section 3.4 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA.
February 2, 2001	In a letter (signed by R. Auluck), NRC requested that FPL provide additional information (RAI) on Section 3.6 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA.
February 2, 2001	In a letter (signed by R. Auluck), NRC requested that FPL provide additional information (RAI) on Sections 4.3, 4.5, 4.6, 4.7.4 and Appendix B, Sections 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.2.1.2, 3.2.1.3, 3.2.1.4, 3.2.5, 3.2.8, 3.2.10, and 3.2.15 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA.
February 8, 2001	In a letter (signed by R. Hovey), FPL provided its response to the NRC RAIs on Sections 2.3.4 and 3.5 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on January 10, 2001.

February 14, 2001	In a meeting summary (signed by S. Koenick), NRC summarized the January 4, 2001, meeting with FPL to discuss staff questions and potential requests for additional information (RAIs) for the Turkey Point Nuclear Plant, Units 3 and 4, LRA.
February 16, 2001	In a letter (signed by R. Hovey), FPL provided its response to the NRC RAIs on Sections 2.3.3.8, 2.4.2.8, and 2.4.2.10 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on January 17, 2001.
February 26, 2001	In a letter (signed by R. Hovey), FPL provided its response to the NRC RAIs on Section 2.3.3.14 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on January 24, 2001.
March 1, 2001	In a letter (signed by R. Newton), the Westinghouse Owners Group (WOG) submitted for staff review topical report WCAP-15338, "A Review of Cracking Associated with Weld Deposited Cladding in Operating PWR Plants (MUHP-6110)."
March 22, 2001	In a letter (signed by R. Hovey), FPL provided its response to the NRC RAIs on Section 3.4 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on February 2, 2001.
March 22, 2001	In a letter (signed by R. Hovey), FPL provided its response to the NRC RAIs on Sections 2.1, 2.3.1, 2.3.2.2, 2.3.3.3, 2.3.3.4, 2.4.1, and 2.4.2.4 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on February 2, 2001.
March 30, 2001	In a letter (signed by R. Hovey), FPL provided its response to the NRC RAIs on Sections 3.7, 4.4, and Appendix B, 3.2.6 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on January 17, 2001.
March 30, 2001	In a letter (signed by R. Hovey), FPL provided its response to the NRC RAIs on Section 3.3 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on February 2, 2001.
March 30, 2001	In a letter (signed by R. Hovey), FPL provided its response to the NRC RAIs on Section 3.6 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on February 2, 2001.
March 30, 2001	In a letter (signed by R. Hovey), FPL provided its response to the NRC RAIs regarding severe accident mitigation alternatives for Turkey Point Nuclear Plant, Units 3 and 4, requested on January 31, 2001.

April 12, 2001 In a letter (signed by R. Anand), NRC requested that WOG provide additional information (RAI) on WCAP-15338, "A Review of Cracking Associated with Weld Deposited Cladding in Operating PWR Plants."

April 19, 2001 In a letter (signed by R. Hovey), FPL provided its response to the NRC RAIs on Section 3.2 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on February 2, 2001.

April 19, 2001 In a letter (signed by R. Hovey), FPL provided its response to the NRC RAIs on Sections 4.2, 4.7.1, and Appendix B, Sections 3.1.5, 3.1.6, 3.1.7, 3.2.1.1, 3.2.2, 3.2.3, 3.2.4, 3.2.9, 3.2.11, 3.2.12, 3.2.13, 3.2.14, and 3.2.16 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on February 1, 2001.

April 19, 2001 In a letter (signed by R. Hovey), FPL provided its response to the NRC RAIs on Sections 4.3, 4.5, 4.7.4, and Appendix B Sections 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.2.1.2, 3.2.1.3, 3.2.1.4, 3.2.5, 3.2.8, 3.2.10, and 3.2.15 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on February 2, 2001.

April 24, 2001 In a meeting summary (signed by S. Koenick), NRC summarized the March 20, 2001, meeting with FPL to discuss draft responses to requests for additional information (RAIs) for the Turkey Point Nuclear Plant, Units 3 and 4, LRA.

April 25, 2001 In an audit Report (signed by T. Quay), NRC issued "Turkey Point Units 3 and 4 License Renewal Application — Scoping/Screening Methodology and Quality Assurance Attribute Audit Report (TAC NOS. MA9939 and MA9943)."

May 2, 2001 In a meeting summary (signed by R. Auluck), NRC summarized the January 24, 2001, meeting with FPL to discuss staff questions and potential requests for additional information (RAIs) for the Turkey Point Nuclear Plant, Units 3 and 4, LRA.

May 3, 2001 In a letter (signed by R. Hovey), FPL provided its supplemental response to NRC RAI 2.1-2 on Section 2.1 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on February 2, 2001.

May 11, 2001 In a letter (signed by R. Hovey), FPL provided its supplemental response to the NRC RAIs on Section 3.7 and Appendix B, Section 3.2.6 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on January 17, 2001.

May 11, 2001 In a letter (signed by R. Hovey), FPL provided its supplemental response to an NRC RAI on Section 3.6 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on February 2, 2001.

May 29, 2001	In a letter (signed by R. Hovey), FPL provided its supplemental response to an NRC RAI on Section 4.2 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on February 1, 2001.
May 29, 2001	In a letter (signed by R. Hovey), FPL provided its supplemental response to the NRC RAIs on Sections 3.7 and 4.4 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on January 17, 2001.
June 15, 2001	In a letter (signed by R. Bryan), WOG provided its response to the NRC RAI on WCAP-15338, "A Review of Cracking Associated with Weld Deposited Cladding in Operating PWR Plants."
June 25, 2001	In a letter (signed by R. Hovey), FPL provided its supplemental response to an NRC RAI on Appendix B, Section 3.1.7 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on February 1, 2001.
July 18, 2001	In a letter (signed by R. Hovey), FPL provided its supplemental response to the NRC RAIs on Sections 2.3.3.10 – 12 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA requested on December 22, 2000.
July 23, 2001	In a letter (signed by H. Christensen), NRC issued its Inspection Report Nos. 50-250/01-09 and 50-251/01-09 documenting the results of its scoping and screening inspection.
July 31, 2001	In a letter (signed by R. Bryan), WOG provided its revised response to the NRC RAI on WCAP-15338, "A Review of Cracking Associated with Weld Deposited Cladding in Operating PWR Plants."
August 13, 2001	In a letter (signed by T. Jones), FPL provided a clarification to its RAI 3.2.3-3 response provided in its April 19, 2001, letter on Section 3.2 of the Turkey Point Nuclear Plant, Units 3 and 4, LRA.
August 17, 2001	In a letter (signed by D.B. Matthews), NRC issued its "Safety Evaluation Report With Open Items Related to the License Renewal of Turkey Point Nuclear Plant, Units 3 and 4."
August 29, 2001	In a letter (signed by R. Auluck), NRC issued a correction to the NRC's transmittal letter of August 17, 2001.
September 25, 2001	In a transcript (issued by N. Gross, court reporter), NRC issued its official transcript of the Advisory Committee for Reactor Safety Plant License Renewal Subcommittee Meeting for the Turkey Point Units 3 and 4 LRA.

October 29, 2001	In a letter (issued by H. Christensen), NRC issued Inspection Report Nos. 50-250/01-11, and 50-251/01-11 regarding the inspection of the Turkey Point facility as it relates to the FPL's application for license renewal for the Turkey Point Units 3 and 4.
October 30, 2001	In a letter (issued by C.I. Grimes), NRC provided additional clarification to FPL regarding its regulatory position for aging management of concrete.
November 1, 2001	In a letter (signed by J.P. McElwain), FPL provided "Turkey Point Units 3 and 4. . . . License Renewal Safety Evaluation Report Open Item and Confirmatory Item Responses and Revised License Renewal Application Appendix A."
November 7, 2001	In a letter (signed by J.P. McElwain), FPL provided "Turkey Point Units 3 and 4. . . . License Renewal Safety Evaluation Report Open Item Regarding Aging Management of Concrete."
November 8, 2001	In a letter (signed by R. Auluck), NRC provided FPL with a revised schedule for the NRC's review for the Turkey Point, Units 3 and 4, LRA.
December 17, 2001	In a letter (signed by J P. McElwain), FPL provided "Turkey Point Units 3 and 4. . . . License Renewal Safety Evaluation Report Open Item and Confirmatory Item Responses and Revised License Renewal Application Appendix A."
February 1, 2002	In a memorandum (signed by B.S. Mallett), Acting Regional Administrator, Region II, provided his recommendations regarding the license renewal for the Turkey Point Units 3 and 4.
February 15, 2002	In a meeting summary (signed by R. Auluck), NRC recommended the October 4, 2001, meeting with FPL to discuss the open items identified in the SER related to Turkey Point Units 3 and 4, LRA.
February 27, 2002	By letter (signed by C.I. Grimes), NRC issued "Safety Evaluation Report Related to the License Renewal of Turkey Point, Units 3 and 4.

APPENDIX B REFERENCES

This appendix contains a listing of references used in preparing the safety evaluation report during the review of the license renewal application (LRA) for Turkey Point, Units 3 and 4, under Docket Nos. 50-250 and 50-251.

American Concrete Institute (ACI)

ACI 201.2R-77, "Guide for Making a Condition Survey of Concrete in Service."

ACI 201.1R, "Guide for Making a Condition Survey of Concrete in Service."

ACI 318-63, "Building Code Requirements for Reinforced Concrete."

American Society of Mechanical Engineers (ASME)

ASME Boiler and Pressure Vessel Code Section III, 1965.

ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components.

ASME Section XI as modified by Code Case N-481.

American Institute of Steel Construction (AISC)

AISC, "Manual of Steel Construction."

American National Standards Institute (ANSI)

ANSI B31.1, "USA Standard Code for Pressure Piping," 1968.

ANSI Z88.2, "Practices for Respiratory Protection."

ANSI B30.2-1976, "Overhead and Gantry Cranes."

American Nuclear Society (ANS)

ANS Standard N46.2,

American Society for Testing Materials

ASTM C295, "Practice for Petrographic Examination of Aggregates for Concrete."

ASTM D-4176, "Standard Test Method for Free Water and Particulate Contamination in Distillate Fuels (Clear and Bright Pass/Fail Procedure)."

ASTM D-1796, "Standard Test Method for Water and Sediment in Fuel Oils by the Centrifuge Method (Laboratory Procedure)."

ASTM A-193,

ASTM E-185, "Standard Practice for Conducting Surveillance Tests for Light- Water Cooled Nuclear Power Vessels."

Babcock and Wilcox

BAW-1543A, Revision 2, "Master Integrated Reactor Vessel Surveillance Program."

BAW-1543, Revision 4, including Supplements 1 and 2, "Master Integrated Reactor Vessel Surveillance Program."

BAW-2178, "Low Upper Shelf Toughness Fracture Mechanics Analysis of Reactor Vessels of B&W Owners Reactor Vessel Working Group for Level C and D Service Loads."

BAW-2312, Revision 1, "Low Upper-Shelf Toughness Fracture Mechanics Analysis of Reactor Vessels of Turkey Point Units 3 and 4 for Extended Life through 48 Effective Full-Power Years."

BAW-2325, "Reactor Vessel Working Group, Response to RAI Regarding Reactor Pressure Vessel Integrity."

Electric Power Research Institute (EPRI)

EPRI TR-102134-R5, "PWR Secondary Water Chemistry Guidelines."

EPRI TR-105714-R4, "PWR Primary Water Chemistry Guidelines."

EPRI TR-107515, "Evaluation of Thermal Fatigue Effects on Systems Requiring Aging Management Review for License Renewal for the Calvert Cliffs Nuclear Power Plant," December 1997.

EPRI NP-5769, "Degradation of Bolting in Nuclear Power Plants," April 1988.

EPRI TR-109619, "Guideline for the Management of Adverse Localized Equipment Environments."

EPRI NP-1558, "A Review of Equipment Aging Theory and Technology."

EPRI NSAC-202L-R2, "Recommendations for Effective Flow-Accelerated Corrosion Program."

Florida Power and Light (FPL)

Correspondence

Letter from R.E. Uhrig (FPL) to J.P. O'Reilly (NRC), "Turkey Point Unit 4, Docket No. 50-250 [sic], IE Bulletin 82-02," July 15, 1983.

Letter from J.W. Williams, Jr. (FPL) to J.P. O'Reilly (NRC), "Turkey Point Unit 3, Docket No. 50-250, IE Bulletin 82-02," March 9, 1984.

Letter from J.W. Williams (FPL) to D.G. Eisenhut (NRC), "Application for Amendment to Licenses DPR-31 and DPR-41, Combining Reactor Materials Surveillance Programs at Both Units into a Single Integrated Program," February 8, 1985.

Letter from R.J. Hovey (FPL) to NRC, "Revised Pressure-Temperature (P/T) Curves, and Cold Overpressure Mitigation System (CMOS) Setpoints," July 7, 2000.

Letter from R.J. Hovey (FPL) to NRC, "Supplemental Response to Request for Additional Information for the Review of the Turkey Point Units 3 and 4 License Renewal Application," May 29, 2001.

Letter from R.S. Kundalkar (FPL) to NRC, "St. Lucie Units 1 and 2 and Turkey Point Units 3 and 4, Docket Nos. 50-335, 50-389, 50-250, and 50-251, Response to NRC Bulletin 2001-01," September 4, 2001.

Turkey Point Nuclear Plant, Unit 3 & 4, Plant Procedures and Technical Products

ENG-QI 5.3, Revision 2, "License Renewal System/Structure Scoping," March 29, 1999.

ENG-QI 5.4, Revision 2, "License Renewal Screening," March 29, 1999.

ENG-QI 5.5, Revision 4, "License Renewal Aging Management Review," April 21, 2000.

ENG-QI 5.6, Revision 4, "License Renewal Time Limited Aging Analysis," February 24, 2000.

PTN-ENG-LRSP-99-0063, Revision 2, "License Renewal System/Structure Scoping Report," October 30, 2000.

PTN-ENG-LRSC-99-0037, Revision 3, "License Renewal Screening Results Summary Report – Structures and Structural Components," November 27, 2000.

PTN-ENG-LRSC-99-0049, Revision 3, "License Renewal Screening Results Summary Report – Containment Structure and Internal Structural Components," August 15, 2000.

FPL Document Package No. 25, Rev. 4, "Samuel Moore Cables."

Reports

Florida Power & Light (FPL) Topical Quality Assurance Report.

Turkey Point Unit 3 and 4 Updated Final Safety Analysis Report.

Submittals

Florida Power and Light Company Application for Renewed Operating Licenses — Turkey Point Units 3 and 4, September 8, 2000.

Institute of Electrical and Electronics Engineers, Inc. (IEEE)

IEEE Std. 323-1974, “Qualifying Class 1E Equipment for Nuclear Power Generating Stations.”

IEEE Std. 334-1974, “Type Tests of Continuous Duty Class 1E Motors for Nuclear Power Generating Stations.”

National Fire Protection Agency (NFPA)

NFPA 10, “Portable Fire Extinguishers.”

NFPA 14, “Standpipe and Hose Systems.”

NFPA 25, “Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.”

Nuclear Electric Insurance Limited (NEIL)

NEIL Property Loss Prevention Standard

Nuclear Energy Institute

NEI submittal of December 11, 1998, “Responses to the NRC Requests for Additional Information on Generic Letter 97-01,” [3-248].

NEI/MRP submittal of Topical Report TP-1001491, Part 2, “PWR Materials Reliability Program Interim Alloy 600 Safety Assessments for U.S. PWR Plant (MRP-44),” [3-247].

NEI 95-10, “Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 — The License Renewal Rule,” Revision 1, January 2000.

NEI 97-06, “Steam Generator Program Guidelines.”

Sandia National Laboratories

SAND 93-7070, “Aging Management Guideline for Commercial Nuclear Power Plants — Heat Exchangers”

SAND 96-0344, "Aging Management Guideline for Commercial Nuclear Power Plants — Electrical Cable and Terminations," Sandia National Laboratories for the U.S. Department of Energy, September 1996.

U.S. Nuclear Regulatory Commission (NRC)

Statements of Consideration (SOC)

60 *Federal Register*, No. 88, "Nuclear Power Plant License Renewal: Revisions," pp 22461 – 22495.

Bulletins (BL)

NRC BL 79-01B, "Guidelines for Evaluation Environmental Qualification of Class IE Electrical Equipment in Operating Reactors," January 14, 1980.

NRC BL 79-17, "Pipe Cracks in Stagnant Borated Water Systems at PWR Plants," July 26, 1979.

NRC BL 80-11, "Masonry Wall Design," May 8, 1980.

NRC BL 82-02, "Degradation of Threaded Fasteners in the Reactor Coolant Pressure Boundary of PWR Plants," June 2, 1982.

NRC BL 88-08, "Thermal Stresses in Piping Connected to Reactor Coolant Systems," June 22, 1988.

NRC BL 88-09, "Thimble Tube Thinning in Westinghouse Reactors," July 26, 1988.

NRC BL 88-11, "Pressurizer Surge Line Thermal Stratification," December 20, 1988.

Circular

NRC Circular 76-06, "Stress Corrosion Cracks in Stagnant, Low-Pressure Stainless Piping Containing Boric Acid Solution at PWRs," November 22, 1976.

Code of Federal Regulations

10 CFR 50.34, "Contents of Application; Technical Information," Section (a)(1).

10 CFR 50.48, "Fire Protection."

10 CFR 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants."

10 CFR 50.55a, "Codes and Standards."

10 CFR 50.60, "Acceptance Criteria for Fracture Prevention Measures for Light-Water Nuclear Power Reactors for Normal Operation."

10 CFR 50.61, "Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events."

10 CFR 50.62, "Requirements for Reduction of Risk from Anticipated Transients Without Scram (ATWS) Events for Light-Water-Cooled Nuclear Power Plants."

10 CFR 50.63, "Loss of All Alternating Current Power."

10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants."

10 CFR 50.71, "Maintenance of Reports, Making of Reports."

10 CFR 50.120, "Training and Qualification of Nuclear Power Plant Personnel."

Appendix A to 10 CFR Part 50, "General Design Criteria."

Appendix B to 10 CFR Part 50, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants."

Appendix G to 10 CFR Part 50, "Fracture Toughness Requirements."

Appendix H to 10 CFR Part 50, "Reactor Vessel Material Surveillance Program Requirements."

Appendix J to 10 CFR Part 50, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors."

Appendix R to 10 CFR Part 50, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979."

10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

10 CFR Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants."

10 CFR Part 100, "Reactor Site Criteria."

Correspondence with FPL

Letter From A. Schwencer (NRC) to R. Uhrig (FPL) concerning "Flooding Safety Evaluation Report," September 4, 1979.

Letter from L. Raghavan (NRC) to J.H. Goldberg (FPL), "Turkey Point Units 3 and 4 – Review of Babcock and Wilcox Owners Group Materials Committee Reports – Upper-Shelf Energy," October 19, 1993.

Letter from R. Croteau (NRC) to J.H. Goldberg (FPL), Turkey Point Units 3 and 4 – Generic Letter (GL) 92-01, Revision 1, Reactor Vessel Structural Integrity, May 9, 1994.

Letter from R. Croteau (NRC) 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.

Turkey Point Units 3 and 4 Operating License Amendment 191/185, September 25, 1996.

Letter from K. Jabbour (NRC) to T. Plunkett (FPL), “Generic Letter 97-01, ‘Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations’: Review of the Responses for the Turkey Point Plant, Units 3 and 4,” January 27, 2000.

Letter from K. Jabbour (NRC) to T. Plunkett (FPL), “Turkey Point Units 3 and 4 – Issuance of Amendments Regarding Boron Credit in the Spent Fuel Pool (TAC Nos. MA7262 and MA7263),” July 19, 2000.

Letter from K. Jabbour (NRC) to T. Plunkett (FPL), “Turkey Point Units 3 and 4 – Issuance of Amendments Regarding Pressure-Temperature Limits and Cold Overpressure Mitigation System Requirements (TAC Nos. MA9500 and MA9502),” October 30, 2000.

Letter from K. Jabbour (NRC) to T. Plunkett (FPL), “Turkey Point Plant, Unit 3 – Relief Request Regarding Safety Evaluation of Risk-Informed Inservice Inspection Program (TAC No. MA8111),” November 30, 2000.

Letter from K. Jabbour (NRC) to J.A. Stall (FPL), “Bulletin 2001-01, Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles’ Responses for the Turkey Point Plant, Units 3 and 4,” November 14, 2001.

Correspondence Other

Letter from D. Matthews (NRC) to J. Taylor (Framatome Technologies), “Babcock and Wilcox Owners Group (B&WOG) Reactor Vessel Working Group Report BAW-1543, Revision 4, Supplement 2, Supplement to the Master Integrated Reactor Vessel Surveillance Program (TAC No. M98089),” July 11, 1997.

Letter from C.I. Grimes (NRC) to D. Walters (NEI), “Guidance on Addressing GSI 168 for License Renewal,” Project 690, June 2, 1998.

Letter from C.I. Grimes (NRC) to D. Walters (NEI), License Renewal Issue No. 98-0013, Degradation-Induced Human Activities, June 5, 1998.

Memorandum from A. Thadani to W. Travers, “Generic Safety Issue (GSI)-190, “Fatigue Evaluation of Metal Components for 60-Year Plant Life,” December 26, 1999.

Letter from C.I. Grimes (NRC) to D. Walters (NEI), License Renewal Issue No. 98-0012, Consumables, March 10, 2000.

Generic Letters (GLs)

NRC GL 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants," March 17, 1988.

NRC GL 89-08, "Erosion/Corrosion-Induced Pipe Wall Thinning," May 2, 1989.

NRC GL 89-13, "Service Water System Problems Affecting Safety-Related Equipment," July 18, 1989,

NRC GL 91-17, "Generic Safety Issue 29, 'Bolting Degradation or Failure in Nuclear Power Plants'," October 17, 1991.

NRC GL 92-01, Revision 1, Supplement 1, "Reactor Vessel Structural Integrity," May 18, 1995.

NRC GL 96-04, "Boraflex Degradation in Spent Fuel Pool Storage Racks," June 26, 1996.

NRC GL 97-01, "Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations," April 1, 1997.

Information Notices (INs)

NRC IN 79-19, "Pipe Cracks in Stagnant Borated Water Systems at Power Plants," July 17, 1979.

NRC IN 86-108, "Degradation of Reactor Coolant System Pressure Boundary Resulting from Boric Acid Corrosion," December 19, 1986.

NRC IN 87-44, "Thimble Tube Thinning in Westinghouse Reactors," September 16, 1987.

NRC IN 89-30 and Supplement 1, "High-Temperature Environments at Nuclear Power Plants," March 15, 1989, and November 1, 1990.

NRC IN 92-86, "Unexpected Restriction to Thermal Growth of Reactor Coolant Piping," December 24, 1992.

NRC IN 93-61, "Excessive Reactor Coolant Leakage Following a Seal Failure in a Reactor Coolant Pump or Reactor Recirculation Pump," August 9, 1993.

NRC IN 93-84, "Determination of Westinghouse Reactor Coolant Pump Seal Failure," October 20, 1993.

NRC IN 93-90, "Unisolatable Reactor Coolant System Leak Following Repeated Application of Leak Sealant," December 1, 1993.

NRC IN 96-32, "Implementation of 10 CFR 50.55a(g)(6)(ii)(A), 'Augmented Examination of Reactor Vessel'," June 5, 1996.

NRC IN 97-31, "Failures of Reactor Coolant Pump Thermal Barriers and Check Valves in Foreign Plants," June 3, 1997.

NRC IN 97-88, "Experiences During Recent Steam Generator Inspections," December 16, 1997.

Reports

NUREG-0578, "TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations," 1979.

NUREG-0588, Rev. 1, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," July 1981.

NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," July 1980.

NUREG-0737, "Clarification of TMI Action Plan Requirements," November 1980.

NUREG-1061, Vol. 3, "Report of the U.S. Nuclear Regulatory Commission Piping Review Committee," November 1984.

NUREG-1437, Volume 1, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants," May 1996.

NUREG-1522, "Assessment of Inservice Conditions of Safety-Related Nuclear Plant Structures," August 1995.

NUREG-1705, "Safety Evaluation Report Related to the License Renewal of Calvert Cliffs Nuclear Power Plant, Units 1 and 2," December 1999.

NUREG-1723, "Safety Evaluation Report Related to the License Renewal of Oconee Nuclear Station, Units 1, 2, and 3," March 2000.

NUREG-1739, "Analysis of Public Comments on the Improved License Renewal Guidance Documents," July 2001.

NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," July 2001.

NUREG/CR-5704, "Effects of LWR Coolant Environments on Fatigue Design Curves of Austenitic Stainless Steels," April 1999.

NUREG/CR-6260, "Application of NUREG/CR-5999 Interim Fatigue Curves to Selected Nuclear Power Plant Components," March 1995.

NUREG/CR-6583, "Effects of LWR Coolant Environments on Fatigue Design Curves of Carbon and Low-Alloy Steels," March 1998.

NRC Regulatory Guide (RG)1.36, "Nonmetallic Thermal Insulation for Austenitic Stainless Steel," October 1973.

NRC RG 1.188, "Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses," July 2001.

NRC RG 1.89, Rev. 1, "Environmental Qualification of Certain Electrical Equipment Important to Safety for Nuclear Power Plants."

NRC RG 1.99, Rev. 2, "Radiation Embrittlement of Reactor Vessel Materials," May 1988.

Draft NUREG-1437, Supplement 5, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants," Regarding Turkey Point Units 3 and 4, May 2001.

Draft NRC Generic Aging Lessons Learned (GALL) Report, August 2000.

Draft NRC DG-1053, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence," June 1996.

Standard Review Plan (SRPs)

NUREG-1800, "Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants," July 2001.

Draft Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants, August 2000.

NRC Branch Technical Positions (BTP)

BTP APCS 9.5-1, Appendix A, "Fire Protection for Nuclear Power Plants."

WCAP Safety Evaluation Reports

FSEER on WCAP-14422, Rev. 2, "License Renewal Evaluation: Aging Management for Reactor Coolant System Supports," November 17, 2000.

FSEER on WCAP-14574, "License Renewal Evaluation: Aging Management Evaluation for Pressurizers," October 26, 2000.

FSEER on WCAP-14575, "License Renewal Evaluation: Aging Management Evaluation for Class 1 Piping and Associated Pressure Boundary Components," November 8, 2000.

FSEER on WCAP-14577, Revision 1, "License Renewal Evaluation: Aging Management for Reactor Internals," February 10, 2001.

FSEER on WCAP-15338, "A Review of Cracking Associated with Weld Deposited Cladding in Operating PWR Plants," October 15, 2001.

Draft SER on WCAP-14574, issued by letter dated August 7, 2000.

Draft SER on WCAP-14575, issued by letter dated February 10, 2000.

Westinghouse Owners Group Generic Technical Reports

WCAP-14422, Rev. 2, "License Renewal Evaluation: Aging Management for Reactor Coolant System Supports," February 1997.

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

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

WCAP-14577, Revision 1, "License Renewal Evaluation: Aging Management for Reactor Internals," October 9, 2000.

WCAP-15093, "Evaluation of EDF Steam Generator Internals Degradation – Impact of Causal Factors on the Westinghouse Models F, 44F, D, and E2 Steam Generators."

WCAP-15338, "A Review of Cracking Associated With Weld Deposited Cladding in Operating PWR Plants (MUHP-6110)," October 2001.

Miscellaneous

NSAC-202L-R2, "Recommendations for Effective Flow-Accelerated Corrosion Program."

Virginia Electric and Power Company Licensee Event Reports (LERs) 50-280/95-007-00 and 50-280/95-007-01, dated October 9, 1995, and February 23, 1996, respectively.

Letter from Connecticut Yankee Atomic Power Company to the U.S. Nuclear Regulatory Commission Document Control Desk, "Haddam Neck Plant Pressurizer Inspection Results (March 1992)."

First Energy, Davis-Besse Nuclear Generating Station, "Root Cause Analysis Report, #2 CCW Pump Trip, CR-1999-1648," October 1999.

J.A. Beavers, K.H. Koch, and W.E. Berry, "Corrosion of Metals in Marine Environments," Metals and Ceramics Information Center Report, July 1986.

NRC Reactor Vessel Integrity Database, available at <http://www.nrc.gov/NRR/RVID/index.html>.

Crane Manufacturers Association of America (CMAA) Specification No. 70, "Specifications for Electric Overhead Traveling Cranes."

THIS PAGE IS INTENTIONALLY LEFT BLANK

APPENDIX C ABBREVIATIONS

A/C	air conditioning
ABVS	auxiliary building ventilation system
ACI	American Concrete Institute
ACRS	Advisory Committee on Reactor Safeguards
AMP	aging management program
AMR	aging management review
ANS	American Nuclear Society
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATWS	anticipated transient without scram
B&W	Babcock and Wilcox
BL	bulletin
BTP	branch technical position
CASS	cast austenitic stainless steel
CBVS	control building ventilation system
CCW	component cooling water
CCSRVS	computer/cable spreading room ventilation system
CFR	<i>Code of Federal Regulations</i>
CLB	current licensing basis
CMAA	Crane Manufacturers Association of America
CRDM	control rod drive mechanism
CRVS	control room ventilation system
CS	condensate system
CST	condensate storage tank
CUF	cumulative usage factor
CVCS	chemical and volume control system
DBD	design-basis document
DCEIRVS	dc equipment/inverter room ventilation system
DG	draft regulatory guide
DOR	Division of Operating Reactors
DWST	demineralized water storage tank
ECCS	emergency core cooling system
ECT	eddy current testing
EDG	emergency diesel generator
EDGB	emergency diesel generator building
EDGBVS	emergency diesel generator building ventilation system
EER	electrical equipment room
EERV	electrical equipment room ventilation
EFPD	effective full-power day
EFPY	effective full-power year
EOL	end of life

EPRI	Electric Power Research Institute
EQ	environmental qualification
ESF	engineered safety features
FAC	flow-accelerated corrosion
FP	fire protection
FPL	Florida Power and Light Company
FSAR	final safety analysis report
FSER	final safety evaluation report
GALL	generic aging lessons learned
GEIS	generic environmental impact statement
GL	generic letter
GSI	generic safety issue
HEPA	high-efficiency particulate air (filter)
HVAC	heating, ventilation, and air conditioning
IASCC	irradiation-assisted stress-corrosion cracking
IEB	Inspection and Enforcement Bulletin
IEEE	Institute of Electrical and Electronics Engineers
IGSCC	intergranular stress-corrosion cracking
IN	information notice
INPO	Institute of Nuclear Power Operations
IPA	integrated plant assessment
ISI	inservice inspection
ITS	improved technical specification
LBB	leak-before-break
LOOP	loss of offsite power
LRA	license renewal application
MCRE	main control room environment
MFS	main feedwater system
MIC	microbiologically influenced corrosion
MRV	minimum required value
NDE	nondestructive examination
NEI	Nuclear Energy Institute
NEPA	National Environmental Policy Act
NRC	Nuclear Regulatory Commission
NUREG	NRC technical report designation
PLL	prescribed lower limits
PTS	pressurized thermal shock
PWR	pressurized-water reactors
PWSCC	primary water stress-corrosion cracking
QA	quality assurance

RAI	request for additional information
RCP	reactor coolant pump
RCS	reactor coolant system
RG	regulatory guide
RHR	residual heat removal
RI-ISI	risk-informed ISI
RPV	reactor pressure vessel
RT	reference temperature
RVHPIP	reactor vessel head Alloy 600 penetration inspection program
SC	structure and component
SCC	stress-corrosion cracking
SER	safety evaluation report
SFP	spent fuel pool
SI	safety injection
SOC	statement of considerations
SPCS	steam and power conversion systems
SRP	standard review plan
SSC	structure, system, and component
TBVS	turbine building ventilation system
TEMA	Tubular Exchanger Manufacturers Association
TLAA	time-limited aging analyses
TS	technical specification
UFSAR	updated final safety analysis report
USE	upper-shelf energy
UT	ultrasonic testing
VHP	vessel head penetration
WCAP	Westinghouse Owners Group generic technical report
WOG	Westinghouse Owners Group

THIS PAGE IS INTENTIONALLY LEFT BLANK

**APPENDIX D
PRINCIPAL CONTRIBUTORS**

<u>NAME</u>	<u>RESPONSIBILITY</u>
E. Andruszkiewicz	Materials Engineering
H. Ashar	Structural Engineering
R. Auluck	Project Manager
G. Bagchi	Structural Engineering
W. Bateman	Management Oversight
B. Boger	Management Oversight
M. Bugg	Quality Assurance
P. Chen	Mechanical Engineering
S. Coffin	Materials Engineering
A. Coggins	Legal Counsel
Y. Correa	Secretarial Support
J. Davis	Materials Engineering
D. Diec	Plant Systems
J. Fair	Mechanical Engineering
D. Frumkin	Plant Systems
R. Goel	Plant Systems
G. Georgiev	Structural Engineering
S. Green	Secretarial Support
C. Grimes	Management Oversight
F. Grubelich	Mechanical Engineering
J. Guo	Plant Systems
M. Hartzman	Mechanical Engineering
A. Hiser	Materials Engineering
G. Holahan	Management Oversight
C. Holden	Electrical Engineering
S. Hou	Structural Engineering
G. Hubbard	Plant Systems
N. Iqbal	Plant Systems
B. Jain	Mechanical Engineering
D. Jeng	Structural Engineering
A. Keim	Materials Engineering
M. Khanna	Materials Engineering
C. Khan	Materials Engineering
S. Koenick	Project Manager
P. Kuo	Management Oversight
C. Lauron	Structural Engineering
A.D. Lee	Mechanical Engineering
A.J. Lee	Mechanical Engineering
C. Li	Plant Systems
Y. Li	Mechanical Engineering
J. Ma	Structural Engineering
K. Manoly	Structural Engineering
J. Medoff	Materials Engineering/Project Manager
J. Moore	Legal Counsel

C. Munson	Structural Engineering
D. Nguyen	Electrical Engineering
A. Pal	Electrical Engineering
P. Patnaik	Structural Engineering
K. Parczewski	Chemical Engineering
J. Pulsipher	Plant Systems
J. Rajan	Mechanical Engineering
J. Raval	Plant Systems
M. Razzaque	Reactor Systems
P. Shemanski	Electrical Engineering
D. Skeen	Plant Systems
J. Strosnider	Management Oversight
E. Sullivan	Materials Engineering
B. Thomas	Plant Systems
A. Walker	Secretarial Support
K. Wichman	Management Oversight