

October 17, 2006

Mr. J. A. Stall
Senior Vice President, Nuclear and
Chief Nuclear Officer
Florida Power and Light Company
P.O. Box 14000
Juno Beach, Florida 33408-0420

SUBJECT: TURKEY POINT NUCLEAR PLANT, UNIT NOS. 3 AND 4 - APPROVAL OF
PROPOSED REACTOR VESSEL MATERIAL SURVEILLANCE CAPSULE
WITHDRAWAL SCHEDULE (TAC NOS. MD2927 AND MD2928)

Dear Mr. Stall:

By letter dated April 1, 2006, Florida Power and Light Company submitted a proposed change to the reactor pressure vessel material surveillance capsule withdrawal schedule for Turkey Point, Units 3 and 4, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements." The proposed revision to the capsule withdrawal schedule was developed to accommodate the 60-year renewed operating licensing period, using the guidance of the American Society for Testing and Materials (ASTM), E-185-82, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels."

Our review is contained in the enclosed safety evaluation. The NRC staff found that the revised surveillance capsule withdrawal schedule for Turkey Point, Units 3 and 4, is acceptable for implementation and satisfies the requirements of Appendix H to 10 CFR Part 50 and the recommendations of ASTM E-185.

Sincerely,

/RA/

L. Raghavan, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-250 and 50-251

Enclosure:
Safety Evaluation

cc w/encl: See next page

October 17, 2006

Mr. J. A. Stall
Senior Vice President, Nuclear and
Chief Nuclear Officer
Florida Power and Light Company
P.O. Box 14000
Juno Beach, Florida 33408-0420

SUBJECT: TURKEY POINT NUCLEAR PLANT, UNIT NOS. 3 AND 4 - APPROVAL OF
PROPOSED REACTOR VESSEL MATERIAL SURVEILLANCE CAPSULE
WITHDRAWAL SCHEDULE (TAC NOS. MD2927 AND MD2928)

Dear Mr. Stall:

By letter dated April 1, 2006, Florida Power and Light Company submitted a proposed change to the reactor pressure vessel material surveillance capsule withdrawal schedule for Turkey Point, Units 3 and 4, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements." The proposed revision to the capsule withdrawal schedule was developed to accommodate the 60-year renewed operating licensing period, using the guidance of the American Society for Testing and Materials (ASTM), E-185-82, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels."

Our review is contained in the enclosed safety evaluation. The NRC staff found that the revised surveillance capsule withdrawal schedule for Turkey Point, Units 3 and 4, is acceptable for implementation and satisfies the requirements of Appendix H to 10 CFR Part 50 and the recommendations of ASTM E-185

Sincerely,

/RA/

L. Raghavan, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-250 and 50-251

Enclosure: Safety Evaluation

cc w/encl: See next page

DISTRIBUTION:

Public LPL2-2 R/F
RidsNrrLABClayton
RidsOgcRp

RidsNrrDorlLpl2-2
RidsNrrDciCvib
RidsRgn2MailCenter

RidsNrrPMBMoroney
RidsAcrsAcnwMailCenter
NRay, NRR

ADAMS Accession No. ML062840713

NRR-106

OFFICE	NRR/LPL2-2/PM	NRR/LPD2-2/LA	NRR/CVIB/BC	NRR/LPL2-2/BC
NAME	BMoroney	BClayton	MMitchell by memo dated	LRaghavan
DATE	10/17/06	10/17/06	10/03/06	10/17/06

OFFICIAL RECORD COPY

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SURVEILLANCE CAPSULE WITHDRAWAL SCHEDULE

TURKEY POINT, UNITS 3 AND 4

FLORIDA POWER & LIGHT COMPANY

DOCKET NOS. 50-250 AND 50-251

1.0 INTRODUCTION

By letter dated April 1, 2006, Florida Power and Light Company (FPL) submitted a proposed change to the reactor pressure vessel (RPV) material surveillance capsule withdrawal schedule for Turkey Point, Units 3 and 4. Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements," such changes require Nuclear Regulatory Commission (NRC) staff review and approval. The NRC staff previously approved the withdrawal schedule in a letter dated April 22, 1985. At that time, Turkey Point, Units 3 and 4, were licensed to operate for 40 years. Subsequently, on June 6, 2002, the licenses were extended for an additional 20 years. The proposed revision to the capsule withdrawal schedule was developed to accommodate the 60-year licensing period.

2.0 REGULATORY EVALUATION

The surveillance program requirements in Appendix H to 10 CFR Part 50 were established to monitor the radiation-induced changes in the mechanical and impact properties of the RPV materials. Appendix H to 10 CFR Part 50 requires licensees to monitor changes in the fracture toughness properties of ferritic materials in the RPV beltline region of light-water nuclear power reactors. Appendix H to 10 CFR Part 50 states that the design of the surveillance program and the withdrawal schedule must meet the requirements of the edition of the American Society for Testing and Materials (ASTM) E-185, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels," that is current on the issue date of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) to which the RPV was purchased. Later editions of ASTM E-185 may be used, but including only those editions through 1982 (ASTM E-185-82). NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," provides additional guidance for the surveillance program for the 60-year extended period of operation.

3.0 TECHNICAL EVALUATION

Enclosure

3.1 Evaluation Criteria of ASTM E-185-82

For Turkey Point, Units 3 and 4, FPL is using the requirements of ASTM E-185-82 as its basis for meeting the RPV surveillance capsule withdrawal requirements of Appendix H to 10 CFR Part 50. Table 1 of ASTM E-185-82 requires that certain minimum numbers of surveillance capsules be removed from each of the vessels, based on the projected nilductility reference temperature shift (ΔRT_{NDT}) of the limiting material at the clad-vessel interface location of the RPV at the end-of-licensed plant life (EOL). ASTM E-185-82 establishes the following criteria for determining the minimum number of capsules that are to be removed in accordance with a withdrawal schedule and the number of capsules that are to be tested:

- For plants with projected ΔRT_{NDT} less than 100 °F (56 °C), three capsules are required to be removed from the RPV and the first two capsules are required to be tested (for dosimetry, tensile-ductility, Charpy-V impact toughness, and alloying chemistry).
- For plants with projected ΔRT_{NDT} between 100 °F (56 °C) and 200 °F (111 °C), four surveillance capsules are to be removed from the RPV and the first three capsules are required to be tested.
- For plants with projected ΔRT_{NDT} above 200 °F (111 °C), five surveillance capsules are required to be removed from the RPV and the first four capsules are required to be tested.

For any of these withdrawal schedules, ASTM E-185-82 specifies that the final surveillance capsule should be withdrawn after accumulating a neutron fluence ($E > 1.0$ MeV) of between one and two times the peak EOL RPV fluence.

For Turkey Point, Units 3 and 4, a minimum of five capsules are required because the limiting weld material has a predicted ΔRT_{NDT} of greater than 200 °F. FPL has already withdrawn four of the five capsules and has proposed a change in a withdrawal schedule for the fifth capsule.

3.2 Changes Proposed to the Withdrawal Schedule for Turkey Point, Units 3 and 4

In accordance with ASTM E-185-82, Table 1, the recommended withdrawal schedule for the fifth capsule (capsule X from Turkey Point, Unit 4, hereafter referred to as capsule 4-X) is such that the surveillance capsule fluence will be between one and two times the peak EOL vessel fluence. EOL for Turkey Point, Units 3 and 4, is equivalent to 48 effective full-power years (EFPY) of operation, based on the renewed license expiration dates of 2032 and 2033, respectively. A change to the surveillance capsule withdrawal schedule is required to meet the EOL fluence requirements for the fifth capsule with the renewed license expiration dates.

The Turkey Point RPVs have experienced two major fuel management changes in their lifetime: the implementation of low-leakage cores and the insertion of part-length hafnium absorbers in peripheral assemblies. In addition, the V capsules in both units were moved to higher lead positions in 1990/1991. The licensee's letter of April 1, 2006, provides the updated RPV surveillance capsule withdrawal schedule for Turkey Point, Units 3 and 4. The measured fluence for Turkey Point, Unit 3, capsule X (capsule 3-X) was used as an approximation of the capsule 4-X fluence, since they both had approximately the same EFPY at the time capsule 3-X

was withdrawn on September 21, 2001. The revised EOL vessel fluence at the limiting weld is projected to be $3.93E19$ neutrons per square centimeter (n/cm^2). FPL proposed to revise the withdrawal schedule for the fifth capsule (capsule 4-X) from 24.0 EFPY to 33.2 EFPY (from 2006 to 2015). The revised schedule will change the surveillance capsule target fluence from $3.85E19$ n/cm^2 to $5.89E19$ n/cm^2 . This revised target fluence is 1.5 times the projected EOL vessel fluence.

The following table summarizes the capsules that have already been removed from Turkey Point, Units 3 and 4, and the proposed withdrawal of the fifth capsule.

Capsule (Unit shown as subscript)	Removal Effective Full-Power Years (EFPY)	Capsule Fluence (n/cm^2)	Notes
T ₃	1.15	7.39×10^{18}	Capsule 1
T ₄	1.17	7.08×10^{18}	
S ₃	3.46	1.72×10^{19}	Capsule 2
S ₄	3.41	1.43×10^{19}	
V ₃	8.06	1.53×10^{19}	Capsule 3
X ₃	19.85	2.93×10^{19}	Capsule 4
X ₄	33.2	5.89×10^{19}	Proposed withdrawal of the fifth capsule

Since capsule 4-X will have a fluence of about 1.5 times the peak vessel EOL fluence at the time of its removal, the staff has determined that the removal of this capsule is consistent with the criterion in ASTM E-185-82 and the recommendations of NUREG-1801 for the final required capsule to be withdrawn and tested.

4.0 CONCLUSION

Based on the NRC's staff's review of the FPL submittal, the NRC staff found that the revised surveillance capsule withdrawal schedule for Turkey Point, Units 3 and 4, RPVs satisfies the requirements of ASTM E-185-82 and the recommendations of NUREG-1801. Therefore, the NRC staff concludes that the licensee's modified surveillance capsule withdrawal schedule for Turkey Point, Units 3 and 4, as provided in the April 1, 2006, letter is acceptable for implementation and satisfies the requirements of Appendix H to 10 CFR Part 50 for the 60-year extended license period.

Principal Contributor: Nihar Ray

Date:

Mr. J. A. Stall
Florida Power and Light Company

cc:

Mr. William E. Webster
Vice President, Nuclear Operations
Florida Power & Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

M. S. Ross, Managing Attorney
Florida Power & Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

Marjan Mashhadi, Senior Attorney
Florida Power & Light Company
801 Pennsylvania Avenue, NW.
Suite 220
Washington, DC 20004

T. O. Jones, Site Vice President
Turkey Point Nuclear Plant
Florida Power and Light Company
9760 SW. 344th Street
Florida City, FL 33035

County Manager
Miami-Dade County
111 Northwest 1 Street, 29th Floor
Miami, Florida 33128

Senior Resident Inspector
Turkey Point Nuclear Plant
U.S. Nuclear Regulatory Commission
9762 SW. 344th Street
Florida City, Florida 33035

Mr. William A. Passetti, Chief
Department of Health
Bureau of Radiation Control
2020 Capital Circle, SE, Bin #C21
Tallahassee, Florida 32399-1741

TURKEY POINT PLANT

Mr. Craig Fugate, Director
Division of Emergency Preparedness
Department of Community Affairs
2740 Centerview Drive
Tallahassee, Florida 32399-2100

Attorney General
Department of Legal Affairs
The Capitol
Tallahassee, Florida 32304

Michael O. Pearce
Plant General Manager
Turkey Point Nuclear Plant
Florida Power and Light Company
9760 SW. 344th Street
Florida City, FL 33035

James Connolly
Licensing Manager
Turkey Point Nuclear Plant
9760 SW 344th Street
Florida City, FL 33035

Mark Warner, Vice President
Nuclear Operations Support
Florida Power and Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

Mr. Rajiv S. Kundalkar
Vice President - Nuclear Engineering
Florida Power & Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

Becky Ferrare
Licensing Department Administrator
Turkey Point Nuclear Plant
9760 SW 344th Street
Florida City, FL 33035