



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 162 TO FACILITY OPERATING LICENSE NO. DPR-31  
AND AMENDMENT NO. 156 TO FACILITY OPERATING LICENSE NO. DPR-41

FLORIDA POWER AND LIGHT COMPANY

TURKEY POINT UNIT NOS. 3 AND 4

DOCKET NOS. 50-250 AND 50-251

**1.0 INTRODUCTION**

By application dated February 25, 1992, Florida Power and Light Company (FPL or the licensee) requested amendments to Facility Operating Licenses DPR-31 and DPR-41 for Turkey Point Units 3 and 4 (the facility) to extend the duration of their operating licenses (OL) to 40 years from the date of OL issuance, rather than from the date of issuance of their construction permits. Additional information in support of the request is provided by the licensee's letters of June 22 and July 13, 1993, which did not change the staff's proposed no significant hazards determination.

Section 103, paragraph c, of the Atomic Energy Act of 1954 and 10 CFR 50.51 provide that an OL is to be issued for a specified period not exceeding 40 years from the date of issuance. 10 CFR 50.56 and 10 CFR 50.57 allow issuance of an OL pursuant to 10 CFR 50.51 after the construction of the facility has been substantially completed, in conformity with the construction permit, and when other provisions specified in 10 CFR 50.57 are met.

The current-licensed term for the facilities is 40 years commencing with the issuance of the construction permits (April 27, 1967) and the OL expires on April 27, 2007. Accounting for the time that was required for plant construction, this represents an effective OL term of approximately 34 years for each unit. Consistent with Section 103.c of the Atomic Energy Act and Sections 50.51, 50.56 and 50.57 of the Commission's regulations, the licensee, by its application of February 25, 1992, seeks to recapture the construction period in the 40-year OL term and thus extend the operating license date for the Turkey Point Units 3 and 4 to July 19, 2012, and April 10, 2013, respectively. The granting of the proposed license amendments would allow the licensee to operate the Turkey Point Units 3 and 4 for an additional 5.25 years and 6 years, respectively, beyond the current expiration dates.

**2.0 EVALUATION**

The staff has reviewed the licensee's application for amendments, and previous licensing documents including the Turkey Point Final Safety Analysis Report (FSAR), the Turkey Point Safety Evaluation Report (SER), and Commission policy and documents, to determine the effects of the licensee's request upon safety.

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The staff's evaluation considered the potential effects to structures, systems and equipment, including the effects due to aging of equipment important to safety and changes in the fracture toughness properties of reactor vessel beltline materials due to neutron irradiation. The evaluation also included the effects of additional years of operation on the environmental impacts addressed in the Turkey Point Final Environmental Statement (FES) dated July 1972. Other areas of the Commission's previous safety review of the Turkey Point units are not affected by the requested extension; the Turkey Point Units 3 and 4 were originally designed and constructed, and have been evaluated by the Commission, on the basis of a 40-year service life.

## 2.1 Radiological and Non-Radiological Impacts

The staff has compared the FES estimates of offsite radiological impacts with the impacts of 40 years of operation of the facility derived from estimates for similar light water reactors. In its evaluation, the staff considered potential radiological and non-radiological impacts as a result of normal radiological releases and potential accidents on the general public residing in the vicinity of the facility. In addition, the staff considered the impacts on workers at the plant of radiation exposure, uranium fuel cycle, and transportation of fuel and waste. In its "Environmental Assessment and Finding of No Significant Impact for Recapturing Construction Period in the License Term - Turkey Point Units 3 and 4" dated April 7, 1994 the staff discussed the historical annual collective doses at Turkey Point since its operation and the licensee's "ALARA" (as-low-as-reasonably achievable) initiatives to minimize radiological doses at Turkey Point and concluded that the radiological impacts due to the proposed action would be insignificant and therefore, acceptable. In its environmental assessment, the staff also concluded that the licensee's compliance with applicable Federal, State and local agency requirements relating to environmental protection will preclude any significant non-radiological environmental impacts associated with the proposed action.

## 2.2 Postulated Accidents

The accident analyses that define Turkey Point plant design bases are simulated using analytical models and assure that the initiating event will not result in radioactive releases that exceed 10 CFR Part 100 dose limits. Such analyses are performed only when major parameters, systems, or components are changed, e.g., plant modifications, fuel design changes, or new analytical methods. Since the operating license extension does not affect either a plant parameter, a system or a component that is important to the safety analysis, the present design basis accident analyses remain valid. Therefore, the staff has determined that the requested additional years of operation will not have any adverse effect on operational exposure at the site or on the accident analysis and therefore, are acceptable.

### 2.3 Effects Upon Structures, Systems and Equipment

The principal factors associated with the additional period of operation which could potentially change the probability or consequences of an accident would be due to aging of equipment important to safety, and changes in the fracture toughness properties of reactor vessel beltline materials due to neutron irradiation.

The licensee's request for OL extension is based on the fact that a 40-year service life was considered during the design and construction of the plant. This does not mean that some components will not wear out during the plant lifetime. Rather, design features were incorporated that facilitate testing, inspections, and performance of preventive and corrective maintenance. The licensee's periodic surveillances and maintenance practices in accordance with industry codes, regulatory requirements and the facility Technical Specifications (TS) provide assurance that any unexpected degradation in plant equipment will be identified and corrected. These inspection requirements will remain in effect throughout the duration of the operating license including the proposed extended operation.

The licensee performed aging analyses of the safety-related components and incorporated their lifetimes in the preventative maintenance, equipment replacement, and environmental qualification program for the plant to ensure that the required safety related electrical and I&C equipment remains qualified, operable, and available to perform its intended safety function regardless of the age of the plant.

The Seismic Category 1 (SCI) structures are designed and constructed considering a 40-year life and include features that facilitate inspection. Since 1991, the licensee has implemented a "material upgrade program" and accordingly, performs a periodic walkdown of safety-related structures, systems and components and takes appropriate corrective actions when degradation is detected. As a result of the staff's inspection of the units' SCI structures and civil engineering features in January 1992, and the licensee's "Containment Tendon Surveillance Program" dated August 10, 1993, which reported deficiencies in the required prestressing forces in the prestressed concrete containment structures (PCCs or containment), the staff identified three concerns. By letter dated June 22, 1993, the licensee provided detailed responses to the staff concerns. The staff concerns and the licensee responses are summarized below.

1. Integrity of the Intake Structure and Cooling-Water Pump Supports: In 1986 the licensee performed a general condition survey of the intake structure which indicated potential for active corrosion of intake structure and cooling water pump supports. Based on these findings, through June 1993, the licensee had inspected, and repaired or replaced, the cooling-water pump supports. The licensee also performed modifications to structural features above the deck which would reduce the rate of intrusion of chloride ions into the support beams for four out of eight bays of the intake structure. The licensee plans to perform



repairs and modifications of the remaining four bays during the scheduled 1994 refueling outages. At that time, the licensee will also inspect and test the intake bay walls for signs of reinforcing bar corrosion and degradation. The licensee's commitment to continued surveillance and maintenance would detect any measurable degradation of the intake structure such that appropriate repairs can be implemented. The staff finds this acceptable.

2. Adequacy of Prestressing Forces in PCCs: The 15th and 20th year tendon surveillances (performed in accordance with the TS) showed that prestress losses for containments are occurring at a rate higher than predicted in their original design. The licensee response indicates that the existing prestressing forces are adequate to meet the design requirements. Additionally, the licensee has initiated reanalyses of both containments and will implement corrective actions if necessary. The staff agrees with the licensee that at present the existing prestressing forces are adequate. However, for the remaining lifetime, the staff is separately evaluating this issue and will be tracking the licensee's actions.
3. Environmental Control Programs for the Containment Tendon Galleries: During the staff's inspection, it was found that the tendon galleries had 100% relative humidity with evidences of water infiltration through the ceiling-wall joints. This condition has caused corrosion of a number of grease caps and tendon bearing plates, and degradation of gallery walls. To reduce the humidity levels, the licensee has reconnected the sump pumps and will revise its procedures to require visual inspections of the tendon galleries every 6 months. These inspections will be in addition to the inspections (three times every 10 years prior to integrated leak rate testing, and every 5 years during tendon surveillances) required by the TS. The licensee has also committed to perform effective inspections of tendon components. The staff finds the inspection frequencies adequate since the inspections would be focused towards detecting the degradation of the tendon load bearing components and implementing corrective actions when warranted.

Based on the above discussion and the licensee commitments, the staff concludes that the safety-related structures will perform their intended function during the proposed license term.

The design of the reactor vessel and its internals considered the effects of 40 years of operation with a plant capacity factor of 80%, i.e., 32 "Effective-Full-Power-Years" (EFPY). The licensee maintains an integrated vessel material surveillance program in accordance with 10 CFR Part 50, Appendix H. The staff has previously reviewed the fracture toughness requirements for protection against pressurized thermal shock events and by its letter dated March 11, 1987, concluded that the calculated reference temperature for pressurized thermal shock ( $RT_{PTS}$ ) meets the 10 CFR 50.61 requirements. 10 CFR 50.61 was amended on May 15, 1991. This amendment changed the method of predicting the effect of neutron irradiation on the reactor vessel beltline materials. Using the revised methodology in 10 CFR

50.61, the staff has determined that at the expiration of their licenses, Turkey Point Units 3 and 4 will be below the pressurized thermal shock screening criterion in 10 CFR 50.61. Therefore, the staff has determined that the facilities can be operated for 40 calendar years (i.e., 32 EFPY), until the proposed extended period of operation, without reaching the pressurized thermal shock screening criterion specified in 10 CFR 50.61. The staff's determination is based on the fact that approved methodologies were used for neutron fluence evaluations and the 80% load factor is conservative and based on historical data. The staff also has previously reviewed the licensee's upper shelf energy fracture analysis of the facility reactor vessels. In our letter dated October 19, 1993 and our safety evaluations dated March 29, 1994 the staff found that, based on 32-EFPY of reactor operation, the Turkey Point reactor vessels have adequate safety margins against fracture, equivalent to those required by Appendix G of the ASME Code Section III, for beltline welds, until the end of the proposed license terms.

Based on the above discussions, the staff finds that extension of operating licenses for Turkey Point Units 3 and 4 to allow a 40-year service life is consistent with safety analyses for the facilities and that the Commission's previous safety determinations are not changed. All issues associated with structures, plant systems, and equipment, including aging and changes in the fracture toughness of materials, have been addressed and are acceptable for 40 years of operation. The site continues to meet the guidelines of 10 CFR 100. Accordingly, we find the proposed change to the expiration dates of the Facility Operating Licenses to be acceptable.

### 3.0 STATE CONSULTATION

Based upon the written notice of the proposed amendments, the Florida State official had no comments.

### 4.0 ENVIRONMENTAL CONSIDERATION

Pursuant to 10 CFR 51.32, an environmental assessment has been published (59 FR 18424) in the Federal Register on April 18, 1994. Accordingly, the Commission has determined that the issuance of this amendment will not result in any environmental impacts other than those evaluated in the Final Environmental Statement.

### 5.0 CONCLUSION

Based on the staff evaluation in Section 2.0 above, the staff concludes that the proposed TS changes are acceptable.

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations,



and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: L. Raghavan, PDII-2

Date: April 20, 1994

DATED: April 20, 1994

AMENDMENT NO. 162 TO FACILITY OPERATING LICENSE NO. DPR-31-TURKEY POINT UNIT 3  
AMENDMENT NO. 156 TO FACILITY OPERATING LICENSE NO. DPR-41-TURKEY POINT UNIT 4

Distribution

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