



L-2001-129  
10 CFR 54

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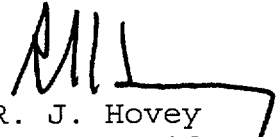
U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D.C. 20555

Re: Turkey Point Units 3 and 4  
Docket Nos. 50-250 and 50-251  
Supplemental Response to Request for Additional Information  
for the Review of the Turkey Point Units 3 and 4  
License Renewal Application

By letters dated March 30, 2001 (L-2001-34) and May 11, 2001 (L-2001-112), FPL provided responses to the Requests for Additional Information (RAIs) associated with Section 4.4, Environmental Qualification, Appendix B Subsection 3.2.6, Environmental Qualification Program, and Section 3.7, Electrical and Instrumentation and Controls of the LRA. Based on the review of our responses, the NRC requested additional information regarding FPL's responses to RAI 4.4.1-1 related to the Environmental Qualification Program and RAI 3.7.1-1 related to aging management review of electrical components. Accordingly, Attachment 1 to this letter contains the supplemental responses to these RAIs.

Should you have any further questions, please contact E. A. Thompson at (305)246-6921.

Very truly yours,

  
R. J. Hovey  
Vice President - Turkey Point

RJH/EAT/hlo

Attachment

Accol

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

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Turkey Point Units 3 and 4  
Docket Nos. 50-250 and 50-251


Response to Request for Additional Information for the Review of  
the Turkey Point Units 3 and 4, License Renewal Application

STATE OF FLORIDA                    )  
  ) ss  
COUNTY OF MIAMI-DADE            )

R. J. Hovey being first duly sworn, deposes and says:

That he is Vice President - Turkey Point 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.

  
\_\_\_\_\_  
R. J. Hovey

Subscribed and sworn to before me this

29<sup>th</sup> day of May, 2001.

Cheryl A. Stevenson

CHERYL A. STEVENSON  
NOTARY PUBLIC - STATE OF FLORIDA  
COMMISSION # CC929576  
EXPIRES 8/18/2004  
BONDED THRU ASA 1-888-NOTARY1

\_\_\_\_\_  
Name of Notary Public (Type or Print)

R. J. Hovey is personally known to me.

**ATTACHMENT 1  
SUPPLEMENTAL RESPONSE TO  
REQUEST FOR ADDITIONAL INFORMATION 4.4.1-1  
TURKEY POINT UNITS 3 AND 4,  
LICENSE RENEWAL APPLICATION**

**SECTION 4.4      ENVIRONMENTAL QUALIFICATION**

**RAI 4.4.1-1:**

In the LRA Section 4.4.1, you have stated that the wear cycle aging effect is only applicable to ASCO solenoid valves for Turkey Point. Provide justification why wear cycle aging effect is not applicable to motors (i.e., Joy motors, Westinghouse motors, MOV actuators, etc.), limit switches, and electrical connectors.

**FPL SUPPLEMENTAL RESPONSE:**

The response below supercedes the response to RAI 4.4.1-1 transmitted in FPL letter L-2001-34 dated March 30, 2001. This response is being revised to provide additional information requested by the NRC staff. The revised response is provided below.

Wear cycling is addressed in the test reports in the Turkey Point Environmental Qualification (EQ) Documentation Packages for motors, limit switches, and electrical connectors when appropriate and is reviewed as part of the aging affects. Typically, the cycling done during testing is significantly more than the application in the plant requires as shown in the discussion below. Therefore, wear cycling is normally not the limiting factor in the qualified life of the equipment and may or may not be specifically discussed in the qualification package. Experience has shown that in certain applications, solenoid valve cycling can approach and even exceed the tested values over the design life of the plant. Thus, it can become the limiting factor in the qualified life of the solenoid valve and therefore was specifically addressed in the LRA. Other wear cycle aging evaluations are discussed below.

The wear cycle for a motor is a start/stop cycle. The Joy and Westinghouse motors in the Turkey Point EQ Program are only used in applications where the component is idle (in standby) for a significant portion of its operating life. Of these motors, the motors that experience the most start/stop cycles are the Residual Heat Removal (RHR) Pump Motors. The design specification for these motors states that the expected number of

cycles during design life, including testing, is 1000. For these motors, motor operation consists of monthly performance testing, maintenance testing, and operation during plant outages for decay heat removal. Allowing for a conservative number of motor start/stop cycles for maintenance testing and refueling outages, in addition to monthly performance tests, the number of start/stop cycles would not exceed 1000 for these motors over a 60-year plant life. The EPRI Power Plant Electrical Reference Series Volume 6 on Motors, page 6-46, states that a motor should be able to withstand 35,000 to 50,000 starts. Thus, the wear cycle aging effect is considered insignificant for Westinghouse and Joy motors. As discussed with the NRC staff, FPL will revise the EQ Documentation Packages for Westinghouse and Joy motors to include a reference to the EPRI Power Plant Electrical Reference Series Volume 6 on Motors. Including this reference in the packages documents the position that the wear cycle aging effect is insignificant for these motors.

For the motors in Limitorque actuators in the Turkey Point EQ Program, the actuators that would be subjected to the most cycles are those associated with valves in the RHR System. Considering there are two actuator motor start/stop cycles for every open/close cycle of its associated valve, and conservatively assuming the valves are subjected to an open/close cycle each time the RHR pumps are operated, motor start/stop cycles associated with Limitorque actuators would not exceed 2000 over a 60-year plant life. As recommended in IEEE 382-1980, Limitorque cycled the actuators 2000 times as part of the environmental qualification testing.

There are no Time-Limited Aging Analyses (TLAAs) associated with limit switches in the EQ program at Turkey Point. The limit switches have a qualified life of less than 40 years based on thermal aging.

The wear cycle for a connector is a mate-demate cycle and the EQ consideration is the effect on the sealing surfaces of the connector. The seal on a Patel/EGS Grayboot connector is created between the outside rubber surface of the plug and the inside rubber surface of the receptacle making inspection of the receptacle sealing surface difficult. Thus, cycling as part of qualification testing is relied upon to demonstrate wear resistance. The Patel/EGS Grayboot electrical connectors that would be cycled most frequently in EQ applications at Turkey Point are the ones associated with normally energized ASCO solenoid valves that are replaced every third refueling cycle. Since Grayboot electrical connectors were not used at Turkey Point until late 1991, this would result in an expected cycling frequency of 10 cycles through the end of the extended period of operation. In the EQ testing done by EGS, the connectors were

cycled at least 140 times prior to being subjected to postulated Design Basis Accident test conditions. Therefore, the cycling for Grayboot electrical connectors is bounding for the expected license renewal period at Turkey Point. It should also be noted that half of the connector would be replaced each time the solenoids are replaced. Therefore, wear cycle aging on the Grayboot connectors is considered insignificant.

The only other connectors in the EQ Program at Turkey Point are those associated with the heated-junction and core exit thermocouples. Two different connector designs are used and cycling as part of qualification testing ranged from 5 to 50 mate-demate cycles depending on whether they would be taken apart only for trouble-shooting or for disassembly of the reactor each refueling outage. However, unlike the Grayboot connectors, these connectors have grafoil gaskets, which are easily inspected for flaws each mate-demate cycle, or copper crush rings that are replaced every mate-demate cycle. Thus, seal qualification is based on inspection or seal ring replacement rather than the mate-demate cycles and wear cycle aging is considered insignificant.

There are no other TLAAAs for EQ equipment that consider wear cycling aging effect, therefore this aging effect is only significant for ASCO solenoid valves as described in the LRA Subsection 4.4.1, page 4.4-3.

RAI 3.7.1-1:

In Sections 3.7.1.1.3, 3.7.1.1.4, and 3.7.1.1.5 of the LRA evaluate the aging effects applicable for electrical components that can be expected to occur due to: (1) moisture-produced water trees, (2) radiation, and (3) heat, depending on environmental conditions. Further, the LRA states that water trees occur when the insulating materials are exposed to long term continuous electrical stress and moisture. These trees eventually result in breakdown of the dielectric materials and ultimate failure. However, the LRA concludes that because Turkey Point uses lead sheath cable to prevent effects of moisture on the cables, there are no requirement[s] for aging management program for medium voltage cable and connections. The LRA also concludes that because the maximum operating doses to insulation material will not exceed the moderate damage dose and because the maximum operating temperature of insulation material will not exceed the maximum temperature for 60 year life, no aging management are required for heat or radiation effects.

Most electrical cables in nuclear power plant[s] are located in dry environments. However, some cables may be exposed to condensation and wetting in inaccessible locations, such as conduits, cables trenches, cable troughs, duct banks, underground vaults or direct buried installations. When energized cable not specifically designed for submergence is exposed to these conditions, water treeing or a decrease in dielectric strength of the conductor insulation can occur. This can potentially lead to electrical failure. The radiation levels most equipment experience during normal service have little degrading effect on most insulation materials. Design-basis calculations or evaluation determine or bound the expected radiation doses for all plant areas. These evaluations usually account for additional doses seen in these areas during to infrequent operations. However, some localized areas may experience higher than expected radiation condition. Typical areas prone to elevated radiation levels include areas near primary reactor-coolant system piping or the reactor-pressure vessel, areas near waste processing systems and equipment, and areas subject to radiation streaming. The most common adverse localized equipment environments are those created by elevated temperature. Elevated temperature can cause equipment to age prematurely, particularly equipment containing organic materials and lubricants. The effects of elevated temperature can be quite dramatic.

Therefore, for non-EQ cables, connections (connectors, splices, and terminal blocks), and electrical/I&C penetration insulation within the scope of license renewal located in the turbine building, intake structure, main steam and feedwater platforms,

yard structures, containment, diesel generator building, and the auxiliary building, provide a description of the following:

- An aging management program for accessible and inaccessible electrical cables, connections, and electrical/I&C penetration insulation exposed to an adverse localized environmental caused by heat or radiation.
- An aging management program for accessible and inaccessible electrical cables used in instrumentation circuits that are sensitive to reduction in conductor insulation resistance exposed to an adverse localized environment caused by heat or radiation.
- An aging management program for accessible and inaccessible medium-voltage (2kV to 15kV) cables (e.g., installed in conduit or directly buried) exposed to an adverse localized environmental caused by moisture-produced water trees and voltage stress.

**FPL SUPPLEMENTAL RESPONSE:**

The response below modifies the response to RAI 3.7.1-1 transmitted in FPL letter L-2001-34 dated March 30, 2001 and supplemented in FPL letter L-2001-112 dated May 11, 2001. Page 13 if 18 of FPL letter L-2001-34 is being revised to delete the sentence after item #3 that begins, "With regard to radiation..." A new item #4 is being added after item #3 and is provided below.

4. With regard to radiation, the only buildings with any appreciable radiation levels are the Containments and the Auxiliary Building. However, non-EQ cables, connections, and penetrations in the Auxiliary Building are not located in areas which would be subject to adverse localized radiation environments during plant operation, including those postulated based on the conservative assumption of 1% failed fuel (see further discussion below).