

UNITED STATES OF AMERICA  
 NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION  
 HAROLD R. DENTON, DIRECTOR

In the Matter of

FLORIDA POWER AND LIGHT COMPANY  
 (Turkey Point Plant, Unit 4)

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Docket No. 50-251  
 (10 C.F.R. 2.206)

DIRECTOR'S DECISION UNDER 10 C.F.R. 2.206

By a letter dated September 11, 1981, signed by Joette Lorion, the Center for Nuclear Responsibility (Center), which is located in South Miami, Florida, petitioned the Nuclear Regulatory Commission to take the following actions in relation to Turkey Point Plant, Unit 4 (Unit 4):

- 1) Immediately order a shutdown to inspect the steam generator tubes; and
- 2) Consider the suspension of the plant's operating license because of concerns over the safety of the reactor pressure vessel.

The petition was referred by the Commission to the Director, Office of Nuclear Reactor Regulation, for action in accordance with 10 C.F.R. 2.206 of the Commission's regulations.

I. Requested Shutdown for Steam Generator Inspection

In summary, the background of the steam generator problem is as follows:

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In the mid-1970's, a number of nuclear power plants, including Turkey Point Plant Unit Nos. 3 and 4, began to have problems with leaking steam generator tubes due to a corrosive process called "denting." On October 29, 1976, the NRC staff set forth minimum requirements to ensure that Units 3 and 4 would not, as a result of this denting phenomenon, operate with reduced integrity of the primary system pressure boundary. Since that time the plants have operated under strict requirements imposed by the NRC staff. <sup>1/</sup>

Under the terms of these requirements, Florida Power and Light Company (FPL) has received permission for short-term extensions of operation for Unit Nos. 3 and 4 in the form of license amendments. Following shut-down, inspection and plugging of tubes that were judged by the licensee to be in danger of leaking in the ensuing 10 months, and NRC staff analysis of the inspection and plugging, license amendments were granted to allow six months of full power equivalent operation.

Subject to operating experience which indicated that further operation before shutdown and inspection would not endanger public health and safety, additional extensions have also been granted, for totals of up to 10 months of full power equivalent operation between inspections.

FPL reported on the last previous inspection of Unit 4, which they performed in November, 1980, in a letter to the Commission dated December 18, 1980. The letter also contained a request for continued operation of Unit 4. After reviewing the inspection results, NRC issued Amendment 54 to License No. DPR-41 on January 15, 1981. Amendment 54 allowed continued operation for six equivalent full

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<sup>1/</sup> Florida Power and Light Company (Turkey Point Plant, Unit 3), DD-80-28  
12 NRC 386, 388 (1980).

power months, commencing January 13, 1981. Operation beyond the six-month period without further inspection was also anticipated and permitted in Amendment 54, but subject to the requirement that "an acceptable analysis of the susceptibility for stress corrosion cracking of tubing is submitted to explicitly justify continued operation of Unit No. 4 beyond the authorized period of operation." 2/

In response to a FPL request dated May 27, 1981 for a four-month extension of operating permission, the NRC staff again reviewed the status of the steam generators in Unit 4. Based upon this re-review, an extension for two equivalent full power months was granted in Amendment 62, dated July 6, 1981.

On July 30, 1981, FPL requested an additional two months operation for Unit 4. Again the NRC staff reviewed the status of the steam generators and based upon this re-review, an additional extension of two equivalent full power months was granted in Amendment 66, dated September 10, 1981. Amendment 66 allowed operation for ten equivalent full power months from January 13, 1981.

An important factor underlying the decision to grant the extensions authorized by Amendment 62 and 66 has been the continued essentially leak-free operation of the steam generators throughout the period in question.

Most recently, on October 19, 1981, FPL has shut down Unit 4 and commenced an inspection of the steam generators. Thus, the request in the

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2/ Facility Operating License No. DPR-41, as amended by Amendment 54, paragraph D(1).



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petition for a shutdown to inspect the steam generators is now moot.

## II. Petitioner's Allegations Concerning Steam Generator Safety

The Center in its petition makes a number of allegations concerning the safety of the steam generators in Unit No. 4.

The first is that Unit 4 is operating with "nearly 25 percent of its steam generator tubes plugged and removed from service. This reduction in heat transfer area could cause this unit to be more susceptible to overheating, necessitating emergency cooling." The Center also states that the steam generator tubes will continue to deteriorate.

FPL sought by application dated April 29, 1980, to operate Unit 4 with 25 percent of steam generator tubes plugged. The staff concluded that operation of Turkey Point Unit No. 4 with up to 25 percent of the tubes plugged is acceptable 3/ and issued Amendment 50 to the license, dated May 15, 1980, which permitted operation with 25 percent of the tubes plugged. A total of 23.8 percent of the tubes were plugged prior to Amendment 54 and the recently concluded period of operation. 4/

Subsequent safety analysis by the staff of FPL's application for Amendment dated March 5, 1981, showed that operation with 28 percent of the tubes plugged is acceptable. Operation with this level of tube plugging was permitted in Amendment 60, dated June 23, 1981.

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3/ Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendments 57 and 50 to Facility Operating Licenses Nos. DPR-31 and DPR-41. (May 15, 1980).

4/ Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 54 to Facility Operating License No. DPR-41, page 4 (January 15, 1981).



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The safety analysis supporting Amendment 60 does not imply that plugging of more than 28 percent of the tubes would be unsafe; the analysis was performed at the 28 percent level because it is expected that the 28 percent limit will be fully sufficient to allow plugging of all tubes which the current inspection of Unit 4 will show might be susceptible to leaking in the foreseeable future. 5/ The plugging is, and has been, carried out by the licensee as a prophylactic program, and it has been successful in preventing leakage since mid-1978. 6/

The Center in its letter quotes the NRC to the effect that, "We do not have an adequate technical basis to predict steam generator performance for periods longer than six months." While the author of the letter does not identify the source of the quotation, a virtually identical statement was made in N.R.C., Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 52 to Facility Operating License No. DPR-31. 7/ The latter statement, however, continues, "... and that our consideration of extended operation beyond six (6) months would depend upon the operating experience at this and similarly

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- 5/ Safety Evaluation by the Office of Nuclear Reactor Regulation Relating to Amendment No. 68 to Facility Operating License No. DPR-31 and Amendment No. 60 to Facility Operating License No. DPR-41 (June 23, 1981). It is expected that approximately 2 percent additional plugging will be required in Unit 4 beyond the current 23.8 percent.
- 6/ Safety Evaluation by the Office of Nuclear Reactor Regulation Relating to Amendment No. 66 to Facility Operating License No. DPR-41 (September 10, 1981).
- 7/ Unit 3 has the same design steam generator as Unit 4 with substantially similar degradation experience.

degraded units." This last quotation reflects the consistent policy of the Commission in relation to Turkey Point Units Nos. 3 and 4. Thus statements concerning six-month maximum prediction period, such as the one quoted by the Center, must be taken in context. In context, it is clear the six-month initial period of operation after an inspection of steam generators may be followed by extensions, provided the technical basis supplied by the licensee, and the relevant operating experience, justify the extensions. This course of action has been followed in relation to Turkey Point Units No. 3 and 4 since 1977 8/ and satisfactorily protects the public health and safety.

The Center further asserts that the "steam generator tubes [of Unit 4] may be on the verge of leaking"; and that, according to a 1975 study by the Union of Concerned Scientists (study not further identified in the Center's letter), rupture of "a handful of tubes" would result in a core melt, with very serious public safety results.

The Staff, based on its studies, does not anticipate that a "handful of tubes" will rupture ("handful" is undefined in the petition), or that such an event, if it should occur, would cause a core melt. Neither does the petitioner advance any factual basis for anticipating such events. Isolated breaks of single tubes which could be described by the word "rupture" have occurred in steam generators similar to those of Unit 4. In these instances, however, the reactors have been shut down in an orderly fashion.

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8/ Florida Power and Light Company (Turkey Point Plant, Unit 3), DD-80-28, 12 NRC-386 (1980).

As indicated above, the steam generator tubes of Unit 4 are being regularly monitored. Moreover, the license for Unit 4 requires a cold shutdown if leakage exceeds the prescribed limit of 0.3 gpm per steam generator. 9/ Staff is of the view that the 0.3 gpm leakage limit, and actions required should this rate be exceeded (along with the monitoring previously described), are fully adequate to protect the health and safety of the public. 10/

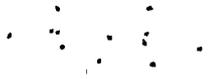
Finally, the Center asserts in its letter that steam generator tube integrity is an unresolved safety issue. While it is true that the problem of steam generator tube integrity is not fully resolved, the problem has received careful ongoing review and analysis, as described above. Accordingly, and in view of the history of the steam generators of Unit 4, further action by NRC regarding Unit 4's steam generators is unnecessary at this time. The procedures and safeguards instituted in relation to that problem are sufficient to safeguard the public health and safety. 11/

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9/ Facility Operating License No. DPR-41, as amended, paragraph D(2).

10/ Safety Evaluations, footnotes 3 and 5, supra.

11/ NRC Regulatory Guide 1.83 contains the standard procedures for inspecting steam generators, which standards are considered adequate by NRC for protecting the public health and safety. The procedures which have been developed for Turkey Point and inserted in Unit 4's operating license as mandatory requirements are significantly more rigorous than the procedures in Regulatory Guide 1.83, and therefore provide an additional margin of safety.



### III. Requested Action With Reference to Reactor Pressure Vessel

The Center asserts that Turkey Point Unit No. 4 is one of a number of nuclear power plants "whose steel pressure vessel may be vulnerable to cracking or shattering caused by thermal shock in the event of an accident that requires high pressure injection emergency cooling." The petition further cites pressure vessel safety as an unresolved safety issue.

During the past few months the subject of reactor pressure vessel thermal shock has received increased attention by the NRC staff and industry representatives. The NRC staff has recently evaluated (1) the types of transients or accidents that could lead to overcooling of the reactor system; (2) experience to date with transients that have occurred in U.S. pressurized water reactors; (3) the probability that such overcooling events will occur; and (4) the capability of reactor vessels to withstand these transients.

As a result of its evaluations to date, the staff has concluded that the probability of a severe overcooling transient is relatively low. For Babcock & Wilcox designed reactors this probability is estimated to be about  $10^{-3}$  per reactor per year, and for Westinghouse and Combustion Engineering designed reactors, it is lower, perhaps by an order of magnitude. The staff has also concluded that, based on present irradiation levels at operating reactors, reactor vessel failure from such an



event in the near term is unlikely. Therefore, no immediate licensing action is required for operating reactors including Unit 4. 12/

However, the staff believes that additional action should be taken to resolve the long-term problem. Toward this end, the staff, the Pressurized Water Reactor (PWR) owners' group, and PWR vendors are working together to determine the scope of the generic pressure vessel problem. In addition, plants with the most limiting condition (in terms of assured period of continued safe operation) in each vendor's group have been selected for individual study. Unit 4 having been selected as one of the plants for plant-specific study, a letter dated August 21, 1981, was sent to require the licensee in accordance with 10 C.F.R. 50.54(f) of the Commission's regulations to submit information for review. Based upon the generic and plant-specific studies and reviews, NRC will take timely action in relation to the reactor vessel problem.

#### IV. Request for "License Review"

The letter from the Center also asked:

that the Nuclear Regulatory Commission take steps to immediately initiate a license review of this nuclear reactor unit [Unit 4]. It is the responsibility of the Nuclear Regulatory Commission to protect the public health and safety, and this can only be accomplished if adequate safety systems exist to protect the public in case of an accident . . . . We hope at this point the NRC will derate the unit, so that it doesn't operate in an unsafe manner.

Requests for a "license review" and to "derate the unit" appear to be synonymous with the request that the NRC consider the suspension of the license of Unit 4. Other than the assertions which have

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12/ Preliminary Assessment of Thermal Shock to PWR Reactor Pressure Vessels, SECY 81-286 (May 4, 1981).

been discussed above concerning the steam generators and reactor vessel, the petitioner advances no facts that relate to possible safety inadequacies.

V. Conclusion

Based on the foregoing discussion, I have determined that the petitioner's request for an order to shut down the Turkey Point Plant Unit 4 to inspect steam generator tubes should be and is hereby denied. Further, based upon the staff analyses of the Reactor Vessel question, I have also concluded that the petitioner's request for consideration of suspension of the license of Turkey Point Unit No. 4 should also be denied.

A copy of this decision will be placed in the Commission's Public Document Room at 1717 H Street, N.W., Washington, D.C. 20555 and the local public document room for the Turkey Point Plant located at the Environmental Urban Affairs Library, Florida International University, Miami, Florida 33199. A copy of this decision will also be filed with the Office of the Secretary of the Commission for its review in accordance with 10 C.F.R. 2.206(c) of the Commission's regulations.

FOR THE NUCLEAR REGULATORY COMMISSION



Harold R. Denton, Director  
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland  
this 5th day of November, 1981.