



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

June 23, 1981

Docket Nos. 50-250  
and 50-251

*Pasted*  
*Amdt 59*  
*to DPR-51*

Dr. Robert E. Uhrig, Vice President  
Advanced Systems and Technology  
Florida Power and Light Company  
Post Office Box 529100  
Miami, Florida 33152

LICENSE AUTHORITY FILE CO  
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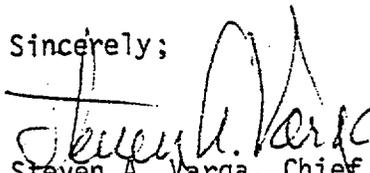
Dear Dr. Uhrig:

The Commission has issued the enclosed Amendment No. 67 to Facility Operating License No. DPR-31 and Amendment No. 59 to Facility Operating License No. DPR-41 for the Turkey Point Plant, Unit Nos. 3 and 4, respectively. The amendments consist of changes to the Technical Specifications in response to your application transmitted by letter dated April 2, 1981, as supplemented April 17, 1981.

These amendments permit continued operation of Unit 3 for six equivalent months of operation and modify the steam generator inspection license conditions for Unit 3 and Unit 4.

Copies of the Safety Evaluation and the Notice of Issuance are also enclosed.

Sincerely;

  
Steven A. Varga, Chief  
Operating Reactors Branch #1  
Division of Licensing

Enclosures:

1. Amendment No. 67 to DPR-31
2. Amendment No. 59 to DPR-41
3. Safety Evaluation
4. Notice of Issuance

cc: w/enclosures  
See next page

Robert E. Uhrig  
Florida Power and Light Company

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Resident Inspector  
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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

FLORIDA POWER AND LIGHT COMPANY

DOCKET NO. 50-251

TURKEY POINT NUCLEAR GENERATING STATION UNIT NO. 4

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 59  
License No. DPR-41

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Florida Power and Light Company (the licensee) dated April 2, 1981, as supplemented April 17, 1981, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public;  
and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

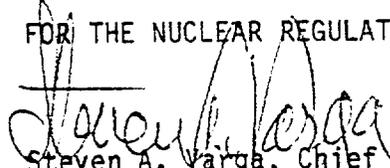
2. Accordingly, paragraph 3.D of License No. DPR-41 is modified to read as follows:

E. Steam Generator Inspections

1. After operation of six equivalent full power months from the last inspection of all three steam generators, Turkey Point Unit 4 shall be brought to the shutdown condition and all three steam generators shall be inspected unless: (1) an inspection of the steam generators is performed within this period, or (2) an extension is granted by the NRC to authorize continued operation beyond the authorized period of operation. Any request for continued operation must be submitted at least 45 days prior to the expiration date of the authorized period of operation. For the purpose of this requirement, equivalent operation is defined as operation with the reactor coolant at a temperature greater than 350 F.
2. Reactor coolant to secondary leakage through the steam generator tubes shall be limited to 0.3 gpm per steam generator. With a steam generator tube leakage greater than this limit, the reactor shall be brought to the cold shutdown condition within 24 hours and an inspection of the leaking steam generator shall be performed.
3. The concentration of radioiodine in the reactor coolant shall be limited to 1.0 microcurie/gram during normal operation and to 30 microcuries/gram during power transients.
4. If primary to secondary leakage attributable to the denting phenomena is detected in 2 or more tubes during any 20 day period an inspection of the leaking steam generator(s) shall be performed by the licensee.
5. The inspection and plugging results from 1, 2, or 4 above shall be submitted to the NRC no later than 14 days following the return to power operation. Any unusual results from the denting inspections shall be reported within 24 hours. If, in the inspections performed under regulatory position C.5 of Regulatory Guide 1.83, more than 10% of the total tubes inspected have detectable wall penetration (20%) or more than three of the tubes inspected exceed the plugging limit, the inspection results shall be reported within 24 hours.

6. The scope of the steam generator inspection and plugging program shall be consistent with FPL letter L-080-412 dated December 18, 1980. The scope of these programs shall be increased, as appropriate, to reflect operating experience and/or analysis.
  7. Prior to resumption of power operation following inspections per 1, 2, and 4 above the licensee shall perform a safety analysis per 10 CFR 50 Section 59.
  8. The Metal Impact Monitoring System (MIMS) shall be contained in the operation with the capability of detecting loose objects. If the MIMS is out of service in other than cold shutdown or refueling mode of operation, this fact shall be reported to the NRC. Any abnormal indications from the MIMS shall also be reported to the NRC by telephone by the next working day and by a written evaluation within two weeks.
  9. Following each startup from below 350 F, core barrel movement shall be evaluated using neutron noise techniques.
3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

  
Steven A. Varga, Chief  
Operating Reactors Branch #1  
Division of Licensing

Attachment:  
Page of Operating License  
DPR-41

Date of Issuance: June 23, 1981

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 59 TO FACILITY OPERATING LICENSE NO. DPR-41

DOCKET NO. 50-251

Replace the following pages of Facility Operating License No. DPR-41 with the attached pages as indicated.

Remove Pages

4

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Insert Pages

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B. Technical Specifications

The Technical Specifications contained in Appendices A and B as revised through Amendment No. 43 are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

C. This license is subject to the following conditions for the protection of the environment:

- (1) The applicant shall pursue evaluations of alternatives to the proposed cooling channel system during construction, interim operation, and evaluation of the channel system. These evaluations shall include at least the following:
  - (a) Study of availability of groundwater or other alternative sources of surface water to use in the cooling system.
  - (b) Study of applicability of mechanical cooling devices, including powered spray modules and cooling towers.
  - (c) Study of marine environmental impacts of once-through cooling alternatives (described in Section X of the AEC Final Environmental Statement on Turkey Point Units 3 and 4, July 1972).
- (2) The applicant shall take appropriate corrective action on any adverse effects determined as a result of monitoring and study programs. To the fullest extent practicable, the applicant shall utilize results of study programs in improving and modifying the operation of the facility and its cooling system so as to achieve a minimal adverse environmental impact.

D. Steam Generator Inspection

1. After operation of six equivalent full power months from the last inspection of all three steam generators, Turkey Point Unit 4 shall be brought to the cold shutdown condition and all three steam generators shall be inspected unless: (1) an inspection of the steam generators is performed within this period, or (2) an extension is granted by the NRC to authorize period of operation. Any request for continued operation must be submitted at least 45 days prior to the expiration date of the authorized period of operation. For the purpose of this requirement equivalent operation is defined as operation with the reactor coolant at a temperature greater than 350 F.

2. Reactor coolant to secondary leakage through the steam generator tubes shall be limited to 0.3 gpm per steam generator. With a steam generator tube leakage greater than this limit, the reactor shall be brought to the cold shutdown condition within 24 hours and an inspection of the leaking steam generator shall be performed.
3. The concentration of radioiodine in the reactor coolant shall be limited to 1.0 microcurie/gram during normal operation and to 30 microcuries/gram during power transients.
4. If primary to secondary leakage attributable to the denting phenomena is detected in 2 or more tubes during any 20 day period an inspection of the leaking steam generator(s) shall be performed by the licensee.
5. The inspection and plugging results from 1, 2, or 4 above shall be submitted to the NRC no later than 14 days following the return to power operation. Any unusual results from the denting inspections shall be reported within 24 hours. If, in the inspections performed under regulatory position C.5 of Regulatory Guide 1.83, more than 10% of the total tubes inspected have detectable wall penetration ( 20%) or more than three of the tubes inspected exceed the plugging limit, the inspection results shall be reported within 24 hours.
6. The scope of the steam generator inspection and plugging program shall be consistent with FPL letter L-80-412 dated December 18, 1980.
7. Prior to resumption of power operation following inspections per 1, 2, and 4 above the licensee shall perform a safety analysis per 10 CFR Section 59.
8. The Metal Impact Monitoring Systems (MIMS) shall be contained in operation with the capability of detecting loose objects. If the MIMS is out of service in other than cold shutdown or refueling mode of operation, this fact shall be reported to the NRC. Any abnormal indications from the MIMS shall also be reported to the NRC by telephone by the next working day and by a written evaluation within two weeks.
9. Following each startup from below 350 F, core barrel movement shall be evaluated using neutron noise techniques.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 67 TO FACILITY OPERATING LICENSE NO. DPR-31  
AND AMENDMENT NO. 59 TO FACILITY OPERATING LICENSE NO. DPR-41

FLORIDA POWER AND LIGHT COMPANY  
TURKEY POINT PLANT UNIT NOS. 3 AND 4  
DOCKET NOS. 50-250 AND 50-251

I. Introduction

By letter dated April 2, 1981, as supplemented April 17, 1981, Florida Power and Light Company (the licensee) submitted the results of the March 1981 steam generator inspection and implemented plugging program for Unit 3 and requested permission to return Unit 3 to power operation for a period of six equivalent full power months.\* The staff has reviewed the license conditions for steam generator inspections. Based on this review, the staff has concluded that the licensee conditions for Unit 3 and Unit 4 should be modified as proposed. The modifications clarify the inspection requirements, and substitute 24 hour reporting requirement, and a licensee safety analysis in place of the requirement of NRC permission for return to power operation.

\*For purposes of this SER, equivalent operation is defined as operation with primary coolant temperature greater than 350°F.

## II. Steam Generator Inspection for Unit 3

Turkey Point Unit 3 is one of several Westinghouse PWR facilities which have experienced extensive denting of the steam generator tubes. By letter dated April 2, 1981, Florida Power and Light Company (the licensee) submitted the results of the March 1981 steam generator inspection at Turkey Point Unit 3. The March 1981 inspection followed 3.5 equivalent months of operation (i.e. operation with the reactor coolant temperature greater than 350 F) since the previous inspection in October 1980. Based upon March 1981 inspection results and implemented plugging repairs, the licensee has requested approval to operate Unit 3 for an additional six equivalent months.

### DISCUSSION

The steam generator tube inspection performed at Turkey Point Unit 3 during October 1980 included programs to assess tube degradation associated with both the denting and wastage phenomena. For denting, tube gauging was performed in all three steam generators using .650 inch, .610 inch, and .540 inch (diameter) eddy current probes. The implemented gauging program was similar to those implemented previously at this and other similarly degraded units and included the gauging of all unplugged tubes within areas (tubelane, periphery, wedge, and patch plate regions of the hot leg, and tubelane region of the cold leg) where significant denting activity had been observed previously.

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Denting activity was observed to be generally consistent with previous experience at this and other similarly degraded units. Tubes in the tubelane region that restrict passage of a .650 inch probe continue to occur at or adjacent to areas where such restrictions have been observed during previous inspections. Only a single tube restricted passage of a .540 inch probe after 3.5 EFPM of operation, compared to 13 such restrictions observed in October 1980 after approximately 8.5 EFPM of operation.

The plugging criteria implemented during the steam generator inspection are the same as those implemented previously at this and other similarly degraded units to support six months operation. These criteria include the plugging of .540 inch and .610 inch restricted tubes and .650 inch restricted tubes in the periphery of the hot leg wedge region and on either side of the patch plate boundary. Implementation of these criteria resulted in the plugging of 10, 23, and 25 tubes in steam generators A, B, and C, respectively, compared to 57, 7, and 22 tubes which were plugged in these steam generators following the previous inspection in October 1980.

The results of the Regulatory Guide 1.83 inspections for wastage in the central bundle region revealed no tubes with indications in excess of the 40% wall penetration plugging limit. A comparison of the eddy current indications equal to or greater than 20% with the corresponding data from the previous outage indicate essentially no change in the average wall penetration during the most recent operating interval of 3.5 EFPM. These comparisons were performed for the cold leg where most of the wastage indications have been observed. As a conservative measure, two tubes exhibiting distorted tubesheet entry signals in March 1981 were plugged. This was done to cover any possibility that sizable defect indications may have been masked by the tubesheet signal. These tubes

had been reported in 1974 as continuing 43 and 44% through wall indications, respectively, which were less than the plugging limit as specified at that time. Inspection of these tubes in subsequent years revealed less than a 20% indication in one tube and no indication in one other.

The small radius u-bends of unplugged tubes in rows 3 through 5 in steam generator C were inspected at 100 KHZ, and no indications were found. All row 1 and 2 tubes were plugged in previous outages.

#### Recurrence of Foreign Matter in Steam Generators

In an April 1, 1981 update to LER 250-79-24, the licensee reported the finding and retrieval of foreign material from the C steam generator hot leg inlet during the March 1981 outage. The foreign material is described as one piece of sheet metal type, ferromagnetic material weighing 255 grams. Eleven pieces (359 grams total) of this material had been found and retrieved from the B and C steam generators during the December 1979 outage. Analyses of a sample of this material showed that the sample is an unalloyed plain carbon steel. The licensee's investigation did not reveal the source of this material. The licensee believes that this material was introduced during a previous refueling shutdown, steam generator inspection outage, or during construction.

Visual examination of the piece of foreign material found in March 1981 supports the conclusion that it originated from the same base piece which was previously discovered. A metal-impact-monitoring system had been used to monitor startups following the previous shutdowns; however, no abnormalities were detected. An inspection of the upper internals and of a 90° sector of the reactor vessel where the reactor coolant piping connects to C steam generator revealed no damage or additional foreign material. The licensee has concluded that the steam generator inspection program augmented by a visual examination of both

the steam generator primary side and the reactor vessel provides assurance that all foreign objects were retrieved from the reactor coolant system. However, the licensee plans to employ the Metal Impact Monitoring System to monitor startup.

### Evaluation

The March 1981 gauging and preventive plugging program at Turkey Point Unit 3 is similar to previous programs conducted at this and other similarly degraded units. Based upon our review of the gauging results, we find that the observed denting activity is generally consistent with previous experience at this and other similarly degraded units, and that the implemented gauging program was sufficient to adequately determine the condition of the steam generator from a denting standpoint.

Preventive plugging criteria implemented in March 1981 and in previous inspections have proven successful in removing from service leaks over the next six months of operation. No forced shutdowns because of denting related tube leaks occurred during the 3.5 EFPM of operation since the October 1980 steam generator inspection, nor during the preceding 8.5 EFPM of operation following the December 1979 inspection. The Technical Specification 0.3 gpm leak rate limit provides adequate assurance that even if through wall cracks and leaks occur, they will be detected and appropriate corrective action taken before excessive leakage can occur from tube degradation during normal operating, transient, or accident conditions.

With regards to the wastage phenomenon, the March 1981 wastage inspection (per Regulatory Guide 1.83) and associated plugging criteria are similar to those implemented in previous inspections. A comparison of the eddy current signals

for tubes containing pluggable indications with corresponding signals from previous inspections indicate that wastage degradation is not developing at a significant or unexpected rate. We consider that the March 1981 inspection was adequate to establish the condition of the steam generators from a wastage standpoint and that with the implemented plugging criteria provides reasonable assurance that unacceptable wastage degradation will not occur during the next operating interval.

With regard to the pieces of foreign material which have been found in the Unit 3 steam generators during recent outages, we do not believe these fragments represent a significant hazard to the safe operation of the steam generators. The staff position regarding the significance of these foreign fragments from the standpoint of the overall reactor coolant system was provided in the staff response dated September 18, 1980 (Docket No. 50-250) to a petition dated July 30, 1980.

In conclusion, we find that the inspection results, implemented plugging, and existing leak rate limits adequately support six equivalent months of operation from the time of this inspection. We recommend that Turkey Point Unit 3 be required to shut down for steam generator inspection at the conclusion of the six (6) month operating interval.

### III. Revision of License Amendments.

Since October 29, 1976, at which time the NRC requested that Turkey Point Unit Nos. 3 and 4 be shutdown (November 1 and November 15, respectively), and the steam generators inspected to ascertain the potential for excessive stress or other conditions that may be conducive to intergranular corrosion of steam generator tubes, both Turkey Point Units have been operating under restrictive conditions. Unit 4, the unit with the most advanced steam generator tube degradation, was operated under Orders from December 3, 1976 until September 22, 1978. The period of operation was authorized by the orders began with a 60 day period, was increased to 120 days and then to six months as confidence was built in the inspection and plugging program. From September 28, 1978 until the present time essentially the same restrictions were imposed by amendments to the license rather than by Orders. The Unit 3 steam generator tubes were degraded but not in as advanced a stage as Unit 4. Consequently, the operating periods were of six months duration from the first amendment to the license on January 14, 1977. Further, the restrictions were imposed by amendments to the license from the outset, rather than by Orders.

The eventuality of requests for extensions of the operating period were included in the license conditions for each unit. Unit 3 operated on nearly an annual inspection period by use of extensions to the base operating period of six months. Unit 4 had a six week extension in February 1978; a 10 day extension in March of 1979, and three extensions of one or two months were granted in 1980.

These extensions were all granted after appropriate review and were based, at least in part, on favorable operating experience. The favorable experience reflected the success of the inspection and plugging program for the Turkey Point steam generator as well as other similarly degraded units.

During the period of time from October 1976 until the present the number of plugged tubes has gradually increased to 20 and 24% respectively. At the same time the outages caused by tube leakages were reduced; there have been no forced outages due to leaks in either unit since February 1978 and July 1977 respectively.

The above brief history serves to point out that the steam generator tube inspection and plugging program has curtailed the leakage. The degradation has continued at a gradually decreasing pace. However, the steam generator integrity has been maintained to the extent that the degraded tubes were plugged before they got to the leaking stage. In addition, an ECCS evaluation was performed each time a new ceiling for plugging percentage was reached.

The staff has therefore concluded that it is time to reevaluate the license conditions that restrict the operation of the Turkey Point Units as proposed. Unit 3 had essentially four license conditions; a limit on the primary coolant activity; a limit on the primary to secondary leakage; a limit of two tube leaks due to denting in a 20 day period between inspections; and an overall limit of six equivalent full power months between inspections. In addition, NRC approval was required before resuming power operation after inspections.

A staff review of the proposed conditions has resulted in approval of the seven conditions. This includes the four listed above but does not include the requirements of NRC approval before return to power operation. Instead, new conditions requiring inspection results within 14 days after return to power operation; special notification to the NRC of any unusual results found in an inspection, a clear delineation of the requirements of the inspection, and a licensee safety evaluation prior to resumption of power operation.

Unit 4 had the same license conditions as Unit 3 and in addition a requirement for a Metal Impact Monitoring System (MIMS) and a core barrel movement test at startup. In addition to the requirements described for Unit 3, these latter two requirements have been retained in the revised Unit 4 license.

In summary, based on past experience with the Turkey Point Units as well as other units with similarly degraded steam generators, we find that the inspection procedures, plugging criteria, etc., have reduced the frequency of denting related leaks for periods of six to ten months. NRC approval for restart is no longer necessary. Additional assurance in the form of reactor coolant leakage limits and iodine concentration will be retained. To further assure the health and safety of the public prompt notification of unusual inspection results is included.

#### IV. Conclusion

We have determined that the amendments do not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we



UNITED STATES NUCLEAR REGULATORY COMMISSIONDOCKET NOS. 50-250 AND 50-251FLORIDA POWER AND LIGHT COMPANYNOTICE OF ISSUANCE OF AMENDMENT TO FACILITY  
OPERATING LICENSES

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 67 to Facility Operating License No. DPR-31, and Amendment No. 59 to Facility Operating License No. DPR-41 issued to Florida Power and Light Company (the licensee), which revised Technical Specifications for operation of Turkey Point Plant, Unit Nos. 3 and 4 (the facilities) located in Dade County, Florida. The amendments are effective as of the date of issuance.

The amendments permit continued operation of Unit 3 for six equivalent months and modify the steam generator inspection license conditions for Unit 3 and Unit 4.

The application for the amendments comply with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendments. Prior public notice of these amendments was not required since the amendments do not involve a significant hazards consideration.

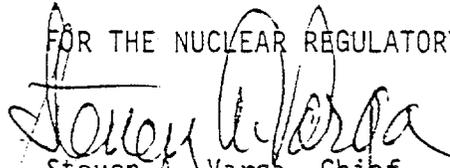
-2-

The Commission has determined that the issuance of these amendments will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of these amendments.

For further details with respect to this action, see (1) the applications for amendments dated April 2 and 17, 1981, (2) Amendment Nos. 67 and 59 to License Nos. DPR-31 and DPR-41, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C. and at the Environmental and Urban Affairs Library, Florida International University, Miami, Florida 33199. A copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Licensing.

Dated at Bethesda, Maryland, this 23 day of June, 1981.

FOR THE NUCLEAR REGULATORY COMMISSION



Steven A. Varga, Chief  
Operating Reactors Branch #1  
Division of Licensing