

October 15, 1987

Docket No. 50-389

Mr. C. O. Woody
Group Vice President
Nuclear Energy
Florida Power & Light Company
P. O. Box 14000
Juno Beach, Florida 33408

Dear Mr. Woody:

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T. Barnhart (4)	

SUBJECT: ISSUANCE OF AMENDMENT (TAC NO. 66045)

The Commission has issued the enclosed Amendment No.24 to Facility Operating License No. NPF-16 for the St. Lucie Plant, Unit No. 2. This amendment consists of changes to the Technical Specifications in response to your application dated September 4, 1987, as supplemented by letters dated September 11 and 15, 1987.

This amendment temporarily adds a special tube inspection region associated with the batwings of the steam generators.

The staff has made a number of changes to your proposed Technical Specifications (TS). The changes have been discussed with and agreed to by your staff on September 29, 1987. The first change adds the requirement that the change is only valid for the upcoming inspection period, estimated to start in early October 1987 (a footnote has been placed in the TS to reflect this). Our review is continuing as to the permanent aspect of the change; we will provide you a supplemental safety evaluation at a later date. The second change deals with footnote number 2 on page 3/4 4-12a. The footnote reads, "The results of the 4.4.5.2.d examinations will not be included in the above percentage calculations in cases involving batwing and vertical strap wear." The last change reflects an increase in the size of the special inspection region. The increased size is reflected in TS 4.4.5.2.d. It should be noted that the enclosed safety evaluation also requires the inspection boundary to be expanded as necessary to incorporate a minimum of two rows of indication-free tubes at the periphery of the inspection pattern.

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Mr. C. O. Woody

- 2 -

October 15, 1987

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's bi-weekly Federal Register notice.

Sincerely,

Original signed by

E. G. Tourigny, Project Manager
Project Directorate II-2
Division of Reactor Projects-I/II
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 24 to NPF-16
2. Safety Evaluation

cc w/enclosures:
See next page

LA: PDI-2
D: M. Ver
10/1/87

PM: PDI-2
E: Tourigny: bg
10/8/87

D: PDI-2
H: Berkow
10/8/87

OGC: *My* ^{revised} *revision to*
my young SE (see note)
10/1/87



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

October 15, 1987

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Group Vice President
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Florida Power & Light Company
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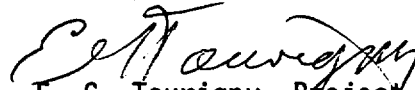
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Mr. C. O. Woody

- 2 -

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E. G. Tourigny, Project Manager
Project Directorate IV-2
Division of Reactor Projects-I/II
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No.24 to NPF-16
2. Safety Evaluation

cc w/enclosures:
See next page

Mr. C. O. Woody
Florida Power & Light Company

St. Lucie Plant

cc:

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

FLORIDA POWER & LIGHT COMPANY

ORLANDO UTILITIES COMMISSION OF

THE CITY OF ORLANDO, FLORIDA

AND

FLORIDA MUNICIPAL POWER AGENCY

DOCKET NO. 50-389

ST. LUCIE PLANT UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 24
License No. NPF-16

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Florida Power & Light Company, et al. (the licensee), dated September 4, 1987, as supplemented by letters dated September 11 and 15, 1987, 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.

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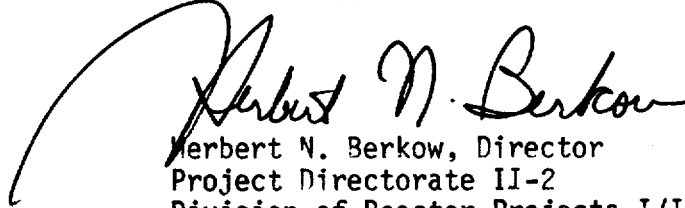
2. Accordingly, Facility Operating License No. NPF-16 is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and by amending paragraph 2.C.2 to read as follows:

2. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 24 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects-I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 15, 1987

ATTACHMENT TO LICENSE AMENDMENT NO. 24
TO FACILITY OPERATING LICENSE NO. NPF-16
DOCKET NO. 50-389

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the area of change. The corresponding overleaf pages are also provided to maintain document completeness.

Remove Pages

3/4 4-12
- -

Insert Pages

3/4 4-12
3/4 4-12a

REACTOR COOLANT SYSTEM

3/4.4.5 STEAM GENERATORS

LIMITING CONDITION FOR OPERATION

3.4.5 Each steam generator shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With one or more steam generators inoperable, restore the inoperable generator(s) to OPERABLE status prior to increasing T_{avg} above 200°F.

SURVEILLANCE REQUIREMENTS

4.4.5.0 Each steam generator shall be demonstrated OPERABLE by performance of the following augmented inservice inspection program.

4.4.5.1 Steam Generator Sample Selection and Inspection - Each steam generator shall be determined OPERABLE during shutdown by selecting and inspecting at least the minimum number of steam generators specified in Table 4.4-1.

4.4.5.2 Steam Generator Tube Sample Selection and Inspection - The steam generator tube minimum sample size, inspection result classification, and the corresponding action required shall be as specified in Table 4.4-2. The inservice inspection of steam generator tubes shall be performed at the frequencies specified in Specification 4.4.5.3 and the inspected tubes shall be verified acceptable per the acceptance criteria of Specification 4.4.5.4. The tubes selected for each inservice inspection shall include at least 3% of the total number of tubes in all steam generators; the tubes selected for these inspections shall be selected on a random basis except:

- a. Where experience in similar plants with similar water chemistry indicates critical areas to be inspected, then at least 50% of the tubes inspected shall be from these critical areas.
- b. The first sample of tubes selected for each inservice inspection (subsequent to the preservice inspection) of each steam generator shall include:

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

1. All nonplugged tubes that previously had detectable wall penetrations (greater than 20%).
 2. Tubes in those areas where experience has indicated potential problems.
 3. A tube inspection (pursuant to Specification 4.4.5.4.a.8) shall be performed on each selected tube. If any selected tube does not permit the passage of the eddy current probe for a tube inspection, this shall be recorded and an adjacent tube shall be selected and subjected to a tube inspection.
- c. The tubes selected as the second and third samples (if required by Table 4.4-2) during each inservice inspection may be subjected to partial tube inspection provided:
1. The tubes selected for these samples include the tubes from those areas of the tube sheet array where tubes with imperfections were previously found.
 2. The inspections include those portions of the tubes where imperfections were previously found.
- *d. Tubes within the following region may be excluded from the first sample:

All nonplugged tubes contained within the bounds of line 66 to line 102 will be inspected nominally 14 to 16 rows from the untubed region adjacent to the tubesheet stay cap. All nonplugged tubes in lines 65 and 103 will be inspected from row 21 to row 35.

No credit shall be taken for these tubes, if all tubes within the region are inspected, in meeting the minimum sample size requirements.

The results of each sample inspection shall be classified into one of the following three categories:

<u>Category</u>	<u>Inspection Results</u>
C-1	Less than 5% of the total tubes inspected are degraded tubes and none of the inspected tubes are defective.
C-2	One or more tubes, but not more than 1% of the total tubes inspected are defective, or between 5% and 10% of the total tubes inspected are degraded tubes.

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

<u>Category</u>	<u>Inspection Results</u>
C-3	More than 10% of the total tubes inspected are degraded tubes or more than 1% of the inspected tubes are defective.

Note: (1) In all inspections, previously degraded tubes must exhibit significant (greater than 10%) further wall penetrations to be included in the above percentage calculations.

*(2) The results of the 4.4.5.2.d examinations will not be included in the above percentage calculations in cases involving batwing and vertical strap wear.

*Applicable only during the Cycle 3 refueling outage.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 24

TO FACILITY OPERATING LICENSE NO. NPF-16

FLORIDA POWER & LIGHT COMPANY, ET AL.

ST. LUCIE PLANT, UNIT NO. ?

DOCKET NO. 50-389

I. INTRODUCTION

By letter dated September 4, 1987, as supplemented September 11 and 15, 1987, Florida Power and Light Company (the licensee) submitted a proposed Technical Specification change pertaining to inservice inspection of steam generator tubes at St. Lucie Unit 2. The proposed change is intended to ensure that all tubes subject to wear-induced degradation from adjacent "batwing" and vertical strap supports will be fully inspected (i.e., 100% sample through U-bends) without involving unnecessary levels of sampling in regions of the tube bundle not subject to this degradation mechanism.

The application was noticed in the Federal Register on September 17, 1987 at 35161. The staff proposed a no significant hazards consideration (NSHC) determination, which was based on the September 4 and 11, 1987 letters. Additional information from the licensee was received by letter dated September 15, 1987. Also, clarifications were made to the licensee's request as a result of telephone conversations with the staff on September 29, 1987. The additional information did not change, in any way, the staff's proposed NSHC determination or significantly alter the scope of the action noticed.

II. EVALUATION

The tubes in the St. Lucie steam generators are supported along their vertical lengths by seven full-diameter eggcrate supports and two partial diameter eggcrate supports. The U-bend and horizontal lengths of the tubes are supported by batwing straps, which cross the tubes just below the start of the U-bend, and as many as five vertical support straps (depending on the horizontal length of the tube). The vertical straps are connected in the out-of-plane dimension by horizontal straps. A stay cylinder is installed at the central portion of the tubesheet to permit reduction of tubesheet thickness. The region above the stay cylinder cannot be tubed and forms a hollow cavity at the center of the tube bundle. Tubes adjacent to this untubed stay cylinder region and contained within lines 65 to 103 and up to row 59 are supported by contact with the bat-

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wings and with as few as one vertical strap. High-velocity two-phase flow up the untubed stay cylinder cavity imparts a force on the batwing supports, resulting in out-of-plane motion of the batwing against the tubes, causing tube wear. Vibration of the batwings ceases when the length of the tubes is long enough to encounter additional vertical supports. Thus, tubes further out in the bundle are not subjected to batwing wear.

Combustion Engineering (CE) has performed extensive testing, including two-phase flow tests and vibration tests, to predict the extent of tubes potentially affected by batwing vibration (Reference: Combustion Engineering Report, CEN-328). Results of these tests were used to develop a computer model to predict the extent and rate of wear for the affected tubes. The model predicts that the wear phenomenon will be contained within a relatively narrow area adjacent to the stay cylinder cavity. By letter dated September 15, 1987, the licensee provided additional information indicating that the inspection results at St. Lucie Unit 2 through the last inspection in 1986 have been in good agreement with model predictions.

In its September 4, 1987 letter, the licensee proposed in part to inspect all tubes from line 66 to line 102, located 10 to 11 tubes from the untubed region. This proposal encompasses the full region of tubes predicted to wear to 40% of the wall thickness over the 40-year plant lifetime. Based on comments received by phone on September 29, 1987 from the NRC staff (discussed below), the licensee agreed to a modification of the proposed change by extending the inspection boundary from 10 to 11 tubes to 14 to 16 tubes in from the untubed region. In addition, tubes located in lines 65 and 103 will be inspected from row 21 to row 35.

As identified in the September 4, 1987 letter, no credit will be taken for tubes inspected within the defined area of 100% inspection in meeting the Technical Specification (TS) sampling requirements in paragraph 4.4.5.2 for tubes located outside the defined area (TS paragraph 4.4.5.2.d). In addition, any indications found within the defined area of 100% inspection would not be counted in establishing the results category for inspections performed outside the defined area (see note (2) at bottom of page 3/4 4-12a of the TS). At the staff's request, the licensee agreed by phone on September 29, 1987 to a modification of note (2) to make it clear that only indications in the defined area involving batwing and vertical strap wear need not be considered.

Finally, for reasons discussed below, the licensee also agreed by phone on September 29, 1987 to the staff's request that the subject TS changes shall be footnoted such that they shall apply only to the upcoming refueling outage.

The staff has not yet had an opportunity to review the tests, analyses, and operating experience in sufficient detail to reach a conclusion regarding a permanent change to the TS. However, it is clear, based on the staff's review to date, that there is adequate basis for an interim change to the TS applicable to the upcoming refueling outage only. Therefore, the staff has granted only part of licensee's request and will act on the request for a permanent change at a later date.

The staff's review indicates that the inspection boundary initially proposed in the licensee's September 4, 1987 letter was generally, but not entirely, conservative with respect to bounding locations where batwing-induced wear indications have been found in the past. Although the licensee continues to believe that its initial inspection boundary proposal is conservative with respect to pluggable (greater than or equal to 40%) indications that may be found in the future, it nevertheless agreed to extend its proposed inspection boundary deeper into the tube bundle to as far as row 65. Beyond row 65, a second vertical support becomes fully effective in limiting tube motion relative to the batwing. The revised inspection boundary encompasses the location of all batwing-induced wear indications to date and all tubes predicted by the CE wear model to develop greater than 10% indications by the end of the 40-year plant lifetime.

Based on the above, the staff finds the proposed inspection boundary to adequately bound the region of the tube bundle which could be potentially affected by batwing-induced wear at the upcoming inspection outage. Since this defined area will receive a 100% inspection under the proposed change to the TS, it follows that the proposed change will provide more, rather than less, assurance that defective tubes will be identified during the upcoming inspection. The staff concludes, therefore, that the TS change requested in the licensee's September 4, 1987, letter is acceptable. This conclusion is subject to modifications to the September 4, 1987 letter, as discussed earlier. In addition, the staff concludes that the inspection boundary defined in TS paragraph 4.4.5.2.d shall be expanded as necessary to incorporate a minimum of two rows of indication-free tubes at the periphery of the inspection pattern. Although this latter item is not addressed by the proposed TS change, the licensee stated in its September 4, 1987 submittal that it would follow this approach.

III. FINDINGS

The staff has concluded that the proposed TS changes, as modified by the staff, may be granted in part and are acceptable based on the details discussed above.

IV. EXIGENT CIRCUMSTANCES

The Commission's regulations, 10 CFR 50.91, contain provisions for issuance of amendments when the usual 30-day public notice period cannot be met. One type of special exception is an exigency. An exigency is a case where the staff and licensee need to act promptly, but failure to act promptly does not involve a plant shutdown, derating, or delay in startup. The exigency case usually represents an amendment involving a safety enhancement to the plant.

Under such circumstances, the Commission notifies the public in one of two ways: by issuing a Federal Register notice providing an opportunity for hearing and allowing at least two weeks for prior public comments, or by issuing a press release discussing the proposed changes, using the local media. In this case, the Commission used the first approach. The proposed

changes were discussed in the September 17, 1987 Federal Register notice at page 35161, with a request for public comments by October 2, 1987.

The St. Lucie Plant, Unit No. 2 is scheduled for refueling in early October. One of the requirements during refueling is to inspect steam generator tubes. The existing TS do not address the recently-identified need to inspect steam generator tubes in the batwing region of the steam generators where wear is occurring. The proposed change would add a special inspection region associated with the batwings, in order to fully characterize the region, monitor tube wear and take remedial action as necessary. The inspection of the remaining tubes in the steam generators will be conducted per the existing TS. Although the wear is a long-term phenomenon which is expected to occur over the life of the steam generators, it is prudent to take action now, during the early stages of the wear. The staff has determined that failure to act in a timely manner would result in requiring the licensee to follow the existing TS regarding steam generator tube sample selection and inspection. The inspection of the steam generator tubes is one of the first major outage-related efforts undertaken because of the length of time that is required to inspect tubes during the outage. Therefore, the staff determined that the overall safety of the plant would be enhanced if the special inspection area was added to the TS prior to the scheduled inspection.

V. STATE/PUBLIC CONSULTATION

The proposed TS changes, as modified by the staff, were discussed with the State of Florida representative. No objections to the issuance of the amendment were made. In addition, there were no public comments in response to the notice published in the Federal Register.

VI. FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The standards used to arrive at a proposed determination that a request for an amendment involves no significant hazards consideration are included in the Commission's regulations, 10 CFR 50.92, which state that the operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) create the possibility of new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

The following evaluation in relation to the three standards demonstrates that the proposed amendment does not involve a significant hazards consideration.

First Standard - Involve a significant increase in the probability or consequences of an accident previously evaluated.

Operation of the facility in accordance with the proposed amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed amendment would increase the surveillance requirements for a defined area of tubes in the steam generators. This inspection pattern ensures that the area within the steam generator tube bundle representing the highest likelihood of damage will be examined. The inspection of the remainder of the tube bundle will continue to be governed by the current TS requirements. The probability of not detecting a steam generator tube problem becomes very low.

Second Standard - Create the possibility of a new or different kind of accident from any accident previously evaluated.

Use of the modified specification would not create the possibility of a new or different kind of accident from any accident previously evaluated.

This modified specification applies to the inspection of a specific region of tubes in the steam generator while maintaining the intent of the specification. Since no changes to the design or operation of the systems or components of the plant are involved, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Third Standard - Involve a significant reduction in a margin of safety.

Use of the modified specification would not involve a significant reduction in a margin of safety.

The margin of safety involved in steam generator tube inspections depends on the accuracy and completeness of the examination. The wear mechanism seen at St. Lucie Unit 2 is well-defined and well within the capability of inspection techniques. Using the predictive models based upon experiments and analysis, the area of concern is identified and will be inspected. The current TS will be applied elsewhere in the steam generator to ensure that future problems (if any) are identified. Therefore, this change will not involve a significant reduction in a margin of safety.

A conference call was held with the licensee on September 29, 1987. The licensee agreed to a number of changes in the TS. The changes are discussed above in the evaluation section. Also, additional information was submitted by the licensee by letter dated September 15, 1987. The results of the conference call and the additional information submitted by letter dated September 15, 1987 did not change, in any way, the staff's proposed NSHC determination or significantly alter the scope of the action noticed.

Based on the foregoing, the Commission has concluded that the standards of 10 CFR 50.92 are satisfied. Therefore, the Commission has made a final determination that the proposed amendment does not involve a significant hazards consideration.

VII ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or a change to a surveillance requirement. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission previously published a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding. The Commission has made a final no significant hazards consideration finding with respect to this amendment. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR §51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

VIII CONCLUSION

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: October 15, 1987

Principal Contributors:

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E. Tourigny