May 30, 1986

Docket No. 50-335

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

Dear Mr. Woody:

The Commission has issued the enclosed Amendment No. 73 to Facility Operating License No. DPR-67 for the St. Lucie Plant, Unit No. 1. This amendment consists of changes to the Technical Specifications in response to your application dated May 30, 1986.

This amendment waives the 40% steam generator plugging limit during Cycle 7 operation, up to June 30, 1986. If at any time during this period, the unit enters any mode other than Modes 1 and 2, or Mode 3 for greater than 24 hours, the unit shall be placed in cold shutdown and the tubes with indications greater than 40% throughwall penetration shall be removed from service prior to exceeding 200°F. We also acknowledge your temporary written commitment to shut the unit down if the total primary to secondary steam generator leakage exceeds 0.3 gallons per minute. This temporary commitment is in effect up to June 30, 1986.

A copy of the related Safety Evaluation is also enclosed. The Notice of Issuance of Amendment and Final Determination of No Significant Hazards Consideration will be included in the Commission's next bi-weekly Federal Register notice.

Sincerely,

/S/

E. G. Tourigny, Project Manager
PWR Project Directorate #8
Division of PWR Licensing-B

Enclosures:
1. Amendment No. 73 to DPR-67
2. Safety Evaluation

cc w/enclosures:
See next page

*See previous white for concurrences

PBD#8*	PBD#8	PBD#8	OELD*	AD:DPL-B
PMKreutzer	ETourigny	AThadani	JScinto	DCrutchfield
5/30/86	5/30/86	5/30/86	5/30/86	/ /86

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5/30/86	/86	/86	/86	/86

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

St. Lucie Plant

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

FLORIDA POWER & LIGHT COMPANY

DOCKET NO. 50-335

ST. LUCIE PLANT UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 73
License No. DPR-67

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Florida Power & Light Company, (the licensee) dated May 30, 1986, 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, Facility Operating License No. DPR-67 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. 73, 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

Ashok C. Thadani, Director
PWR Project Directorate #8
Division of PWR Licensing-B

Attachment:
Changes to the Technical
Specifications

Date of Issuance: May 30, 1986

ATTACHMENT TO LICENSE AMENDMENT NO. 73

TO FACILITY OPERATING LICENSE NO. DPR-67

DOCKET NO. 50-335

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

Remove Page	Insert Page
3/4 4-8	3/4 4-8

b. If the inservice inspection of a steam generator conducted in accordance with Table 4.4-2 requires a third sample inspection whose results fall in Category C-3, the inspection frequency shall be reduced to at least once per 20 months. The reduction in inspection frequency shall apply until a subsequent inspection demonstrates that a third sample inspection is not required.

c. Additional, unscheduled inservice inspections shall be performed on each steam generator in accordance with the first sample inspection specified in Table 4.4-2 during the shutdown subsequent to any of the following conditions.

1. Primary-to-secondary tubes leaks (not including leaks originating from tube-to-tube sheet welds) in excess of the limits of Specification 3.4.6.2,

2. A seismic occurrence greater than the Operating Basis Earthquake,

3. A loss-of-coolant accident requiring actuation of the engineered safeguards, or

4. A main steam line or feedwater line break.

4.4.5.4 Acceptance Criteria

a. As used in this Specification:

1. Imperfection means an exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal tube wall thickness, if detectable, may be considered as imperfections.

2. Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube.

3. Degraded Tube means a tube containing imperfections $\geq$20% of the nominal wall thickness caused by degradation.

4. % Degradation means the percentage of the tube wall thickness affected or removed by degradation.

5. Defect means an imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective. Any tube which does not permit the passage of the eddy-current inspection probe shall be deemed a defective tube.

6. Plugging Limit means the imperfection depth at or beyond which the tube shall be removed from service because it may become unserviceable prior to the next inspection and is equal to 40%* of the nominal tube wall thickness.

7. Unserviceable describes the condition of a tube if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break as specified in 4.4.5.3.c, above.

8. Tube Inspection means an inspection of the steam generator tube from the point of entry (hot leg side) completely around the U-bend to the top support of the cold leg.

b. The steam generator shall be determined OPERABLE after completing the corresponding actions (plug all tubes exceeding the plugging limit and all tubes containing through-wall cracks) required by Table 4.4-2.

4.4.5.5 Reports

a. Following each inservice inspection of steam generator tubes, the number of tubes plugged in each steam generator shall be reported to the Commission within 15 days.

b. The complete results of the steam generator tube inservice inspection shall be included in the Annual Operating Report for the period in which this inspection was completed. This report shall include:

1. Number and extent of tubes inspected.

2. Location and percent of wall-thickness penetration for each indication of an imperfection.

3. Identification of tubes plugged.

*This 40% plugging limit is not applicable during the cycle 7 operation up to June 30, 1986. If at any time during this period the unit enters any Modes other than Modes 1 and 2, or Mode 3 for greater than 24 hours, the unit shall be placed in cold shutdown and the tubes with indications greater than 40% through-wall penetration shall be removed from service prior to exceeding 200°F.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 73

TO FACILITY OPERATING LICENSE NO. DPR-67

FLORIDA POWER & LIGHT COMPANY

ST. LUCIE PLANT, UNIT NO. 1

DOCKET NO. 50-335

1.0 INTRODUCTION

By letters dated May 28 and May 30, 1986, Florida Power and Light, the utility for St. Lucie Unit 1 (PSL-1) has requested a temporary waiver of the requirements of Technical Specifications 3.4.5 regarding the specific details of the operability of the steam generators and an Emergency License Amendment of the steam generator plugging limit for St. Lucie Unit 1.

Three steam generator tubes were removed from the A steam generator of PSL-1 during the Winter 1985 outage. These were then sent to B&W for examination in order to better characterize the eddy current (ET) indications noted during the 1984 and 1985 examinations. The laboratory work and its correlation to the field ET results have been provided by the licensee. The presence of grain boundary degradation in the form of intergrannular attack (IGA) with some stress corrosion cracking (SCC) caused a review of all the 1985 ET data, a comparison of defects from 1984, as well as data from earlier ET examinations.

Using the B&W results as an indicator, the results of the 1985 ET examination revealed the presence of seventeen indications having depth greater than 40% of the tube wall thickness. Since the Technical Specifications limit the defect size to less than 40% of the wall thickness, these tubes would have to be removed from service by plugging unless a waiver is granted for continued operation. These indications had typically been classified by the licensee as either Distorted Support Signals (DSS) or Undefined Signals (UDS). While direct comparisons of previous ET data was difficult due to the use of differing equipment and techniques, the licensee concluded that there is no significant change in indication depth or signal amplitude between the 1984 and 1985 data, and indications can be identified in certain tubes as early as 1981 in the majority of cases.

The licensee has provided test data and results of metallographic examination of pulled tubes in support of their request for a temporary waiver of the Technical Specifications 3.4.5.

2.0 EVALUATION

Staff evaluation of the licensee submittal consists of three main areas, structural integrity of tubing under normal operation and accident conditions, allowances due to uncertainty in eddy current measurements, and the projected degradation allowance for the proposed period of operations. These are discussed in the following paragraphs.

Structural Integrity

The licensee has performed tests on samples of tubing with comparable material properties and heat treatment as the PSL-1 steam generator tubing. The tests used throughwall cracks 3/8", 15/16", and 1-1/2" in length for the leak-before-break test. The results demonstrate that the leakage of throughwall crack of the size seen on PSL-1 under differential pressure of a Main Steam Line Break (MSLB) are well below those assumed in the Safety Evaluation. These results are conservative in that the maximum crack length seen at PSL-1 is approximately .8". In addition, burst tests run on CE tubing for 3" long, fully circumferential IGA verify that IGA at 70% of the wall penetration could withstand over twice the MSLB pressure differential prior to bursting.

Calculations performed by the licensee and staff independently indicate that for PSL-1 steam generator tubing (3/4 inch OD x 0.048 inch nominal wall thickness), a wall thickness of 0.018 inches or 37% of the nominal wall thickness is necessary to meet the limiting requirements of Regulatory Guide 1.121 (maintaining a factor of three against burst during normal operation) without consideration of allowances for continued degradation during the proposed period of operation and ECT uncertainty. Of the seventeen indications revealed to be greater than 40% of wall penetration, the most severe degradation is 66% in depth. The factor of safety against burst for the flaw under normal operation without consideration of other allowances will be 2.7. Consideration of allowances for uncertainty in eddy current measurements and continued possible degradation during a one month operating period which are discussed in the following two paragraphs would result in further reduction of this safety margin to approximately 2.0.

While this calculated margin is less than 3.0, the actual margins are not likely to be significantly different from the required value due to the consservatisms in the analysis. For example, it was conservatively assumed in the calculations for the safety margins that all structural material affected by IGA is absent from the tube wall. This assumption was made due to a lack of data on the precise contribution of the IGA affected material to the tube strength.

Staff has not performed detailed calculations on the compliance with faulted stress limits of the ASME Code for the most severe degradation. Simplified calculations however indicate that these limits are likely to be met for the specific tubes in question. Since the probability of the occurrence of a Main Steam Line Break or a Loss of Coolant Accident during the limited period of operation is considered to be very low, acceptance of these flaws in the absence of detailed calculations for faulted conditions is justified.

Eddy Current Measurements

A summary of the eddy current (ET) indications noted during the 1984 and 1985 examinations has been provided by the licensee. Comparison of previous eddy current data are difficult due to the use of different probes, 560 and 580 probes, in the two inspections. Once the defects were identified in the 1985 inspection it was possible to sort out the signals from the background noise on 1984 data and a comparison of the depth and amplitudes was made. The following conclusions were reached by the licensee from this comparison:

a) There is no significant change in indication depth or signal amplitude between the 1984 and 1985 data, and

b) Indications can be identified in certain tubes as early as 1981 in the majority of cases. A small number can be tracked in 1979.

A correlation of the eddy current and metallographic examination in the laboratory provided by the licensee indicates that in general the field measurements overcalled the actual depth but in two instances defects which could not be identified in the field were found to contain patches of IGA which was revealed on bending.

In spite of the licensee's conclusion that their field ET results tend to overcall the depth of IGA penetration based on the limited three pulled tubes and, in view of documented difficulties, generally shared by the ET industry in identifying and quantifying IGA, an uncertainty allowance of 10% in eddy current measurements was assumed by the staff in the calculations of acceptable defect depths and margins of safety discussed earlier.

Projected Degradation During One Month Operating Period

The results of the historical data review demonstrate that the attack has occurred early in the operating life of the plant, and has not grown significantly during the latest cycle. That the corrosion occurred early in the operating life of St. Lucie Unit 1 is further evidenced in the improvement in steam generator water chemistry beginning in 1978. Furthermore, since late 1982 the St. Lucie Units have been operating with a very stringent secondary water chemistry control program based upon the EPRI Steam Generator Owner's Group (SGOG) PWR Secondary Water Chemistry Guidelines. This conclusion can also be supported by the improvement in secondary water chemistry since the adoption of EPRI Water Chemistry Guidelines. Based on these considerations it appears that corrosion will be minimal during the one month period of operation and the rate of degradation is not likely to change significantly.

Following industry and regulatory practice, a projected corrosion rate of 10% of the nominal tube wall thickness during the inspection cycle has been assumed by the staff in calculating the safety margins discussed earlier.

3.0 CONCLUSION

Based on a review of the test data, laboratory examination results of pulled tubes and independent staff calculations, it is concluded that the seventeen tubes with indications of depths greater than 40% of wall thickness can be allowed a temporary waiver of the requirements of Technical Specifications 3.4.5 for a period of one month. This conclusion is based on the following considerations:

> The margins of safety against failure for these seventeen affected tubes are not significantly different from those required by the Technical Specifications since (a) the degradation during the one month period is likely to be minimal, (b) the probability of occurrence of either a Main Steam Line Break or a Loss of Coolant Accident are considered to be very low during the proposed limited period of plant operation and (c) throughwall cracks are likely to leak-before-break and would not fail in a catastrophic manner.

The staff also evaluated the emergency basis for issuing the technical specification change. The licensee applied for the change on May 30, 1986, shortly after the problem was discovered. The licensee states that the change is needed in order to continue interim operation for a period up to 30 days. If approval is not given on an emergency basis, the unit will need to be shutdown. The staff agrees that the amendment needs to be issued under emergency circumstances as defined in 10 CFR 50.41(a)(5) which states "Where the Commission finds that an emergency situation exists, in that failure to act in a timely way would result in derating or shutdown of a nuclear power plant, it may issue a license amendment involving no significant hazards consideration without prior notice and opportunity for a hearing or for public comment.

4.0 Final No Significant Hazards Consideration Determination

The Commission's regulations in 10 CFR 50.92 state that the Commission may make a final determination that a license amendment involves no significant hazards consideration if operation of the facility in accordance with the amendment would not: (1) Involve a significant increase in the probability of consequences of an accident previously evaluated; or (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

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, nor would it involve a significant reduction in a margin of safety. There is a high degree of confidence in the indication status of all the tubes in both steam generators. Some tubes exceed the plugging limit of 40% and the degradation mechanism has been attributed to intergranular attack (IGA). While this may entail some reduction in the margin against burst pressure, this reduction is not considered significant during the next 30 days, based on a number of considerations.

The IGA has not progressed significantly over the last cycle (cycle 6). The licensee has advised the staff that there is no primary to secondary leakage in the steam generators at this time. Therefore, primary to secondary isolation is currently being maintained in the generators. The staff would expect a tube to leak before it breaks, and the licensee has administratively implemented a 0.3 gallon per minute (gpm) shutdown limit, versus the Technical Specification value of 1.0 gpm. The significance of lowering the permissible leakage limit is that if the tube starts leaking, the lower limit will require a shutdown sooner while the tube still has margin against bursting. Last, the period of operation proposed in the amendment is no more than 30 days. Based upon consideration of all the above factors, the staff does not believe that a significant increase in the probability or consequences of an accident previously evaluated is involved, nor does the staff believe that a significant reduction in the margin of safety is involved.

Operation of the facility in accordance with the proposed amendment would not create the possibility of a new or different kind of accident from any accident previously evaluated. Accidents previously evaluated include steam generator tube rupture accident, main steam line break accident, and main feedwater line break accident. The staff does not believe that operation in the proposed manner for up to a 30 day period would create the possibility of a new or different kind of accident from any accident previously evaluated.

Based upon the above considerations, the staff concludes that the proposed amendment meets the three criteria of 10 CFR 50.92 and, therefore, involves no significant hazards considerations.

5.0 STATE CONSULTATION

The State of Florida was consulted on this matter and had no comments on the determination.

6.0 ENVIRONMENTAL CONSIDERATION

The 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 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.

7.0 CONCLUSION

The staff has concluded, that: (1) because the amendment does not involve a significant increase in the probability or consequenses of an accident previously evaluated, does not create the possibility of an accident of a type different from any evaluated previously, and does not involve a significant reduction in a margin of safety, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) 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: May 30, 1986

Principal Contributors:
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R. Rajan