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Docket No. 50-261

Mr. J. A. Jones
 Executive Vice President
 Carolina Power & Light Company
 336 Fayetteville Street
 Raleigh, North Carolina 27602

Dear Mr. Jones:

The Commission has issued the enclosed Amendment No. 44 to Facility Operating License No. DPR-23 for the H. B. Robinson Steam Electric Plant Unit No. 2. The amendment consists of changes to the Technical Specifications in response to your request dated November 4, 1976 and the supplemental information provided in your letters dated June 30, 1977, July 29, 1977, June 9, 1978, August 9, 1978 and April 9, 1979.

The amendment establishes Technical Specifications to assure inspection and reporting requirements for a program of inservice inspection of steam generator tubing consistent with the requirements of Revision 1 of Regulatory Guide 1.83.

Certain revisions of the proposed Technical Specifications were necessary to meet our requirements. These changes have been discussed with your staff and, as agreed, have been incorporated into this amendment.

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

Sincerely,

A. Schwencer, Chief
 Operating Reactors Branch #1
 Division of Operating Reactors

Enclosures:

1. Amendment No. 44 to DPR-23
2. Safety Evaluation
3. Notice

cc w/enclosure:
 see next page

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oel

OFFICE	DOR:ORB1	DOR:ORB	DOR:ORB A	DOR:AD/GRP	OELD	DOR:ORB1
SURNAME	J. Neighbors	P. Kreutzer	M. FAIRTILE	W.P. Gammill	S. H. Lewis	A. Schwencer
DATE	10/5/79	10/5/79	11/5/79	10/6/79	10/2/79	10/17/79

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

November 17, 1979

Docket No. 50-261

Mr. J. A. Jones
Executive Vice President
Carolina Power & Light Company
336 Fayetteville Street
Raleigh, North Carolina 27602

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Certain revisions of the proposed Technical Specifications were necessary to meet our requirements. These changes have been discussed with your staff and, as agreed, have been incorporated into this amendment.

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

Sincerely,

A handwritten signature in cursive script, appearing to read "A. Schwencer".

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosures:

1. Amendment No. 44 to DPR-23
2. Safety Evaluation
3. Notice

cc w/ enclosure:
see next page

Mr. J. A. Jones
Carolina Power and Light Company - 2 -

November 17, 1979

cc: G. F. Trowbridge, Esquire
Shaw, Pittman, Potts and Trowbridge
1800 M Street, N.W.
Washington, D. C. 20036

U. S. Environmental Protection Agency
Region IV Office
ATTN: EIS COORDINATOR
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Hartsville Memorial Library
Home and Fifth Avenues
Hartsville, South Carolina 29550

Mr. McCuen Morrell, Chairman
Darlington County Board of Supervisors
County Courthouse
Darlington, South Carolina 29535

State Clearinghouse
Division of Policy Development
116 West Jones Street
Raleigh, North Carolina 27603

Attorney General
Department of Justice
Justice Building
Raleigh, North Carolina 27602

Michael C. Farrar, Chairman
Atomic Safety and Licensing
Appeal Board Panel
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Richard S. Salzman
Atomic Safety and Licensing
Appeal Board Panel
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dr. W. Reed Johnson
Atomic Safety and Licensing
Appeal Board Panel
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Director, Technical Assessment Division
Office of Radiation Programs (AW-159)
U. S. Environmental Protection Agency
Crystal Mall #2
Arlington, Virginia 20460



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

CAROLINA POWER AND LIGHT COMPANY

DOCKET NO. 50-261

H. B. ROBINSON STEAM ELECTRIC PLANT UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 44
License No. DPR-23

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Carolina Power and Light Company (the licensee) dated November 4, 1976, as supplemented June 30 and July 29, 1977, June 9 and August 9, 1978, and April 9, 1979, 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, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-23 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 44, 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



A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 17, 1979

ATTACHMENT TO LICENSE AMENDMENT NO. 44

FACILITY OPERATING LICENSE NO. DPR-23

DOCKET NO. 50-261

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.

Remove

Insert

4.2-2

4.2-2

4.2-2a

4.2-2b

4.2-2c

4.2-2d

4.2-3

4.2-3

4.2-16

4.2-16

4.2-25

- 4.2.2 The inspection interval shall be 10 years
- 4.2.3 The following definitions shall apply to the inspection methods employed in Table 4.2-1.
- a. UT - Volumetric examination using ultrasonic techniques
 - b. RT - Radiographic examination. Ultrasonic testing is an acceptable alternate for RT.
 - c. MT - Examination of the component surface using magnetic particle.
 - d. PT - Examination of the component surface using dye penetrant.
 - e. V - Visual examination directly by the eye or assisted by remote viewing devices equal to or better than direct observation.

4.2.4 Examinations which reveal unacceptable structural defects in a category shall be extended to include an additional number (or areas) of system components or piping in the same category approximately equal to that initially examined. In the event further unacceptable structural defects are revealed, all remaining system components or piping in the category shall be examined to the extent specified in that examination category.

4.2.5 Inservice Inspection of Steam Generator Tubes

4.2.5.1.1 Tube Inspection

Entry from the hot-leg side with examination from the point of entry completely around the U-bend to the top support of the cold-leg is considered a tube inspection.

4.2.5.1.2 Sample Selection and Testing

Selection and testing of steam generator tubes shall be made on the following basis:

- (a) One steam generator shall be inspected during inservice inspection in accordance with the following requirements:

- 1. The inservice inspection may be limited to one steam generator on a rotating sequence basis. This examination shall include at least 9% of the tubes if the results of the first or a prior inspection indicate that all three generators are performing in a comparable manner.

2. When other steam generators are required to be examined by Table 4.2-2 and if the condition of the tubes in one or more generators is found to be more severe than in the other steam generators, the steam generator sampling sequence at the subsequent inservice inspection shall be modified to examine the steam generator or generators with the more severe condition.

(b) The minimum sample size, inspection result classification and the associated required action shall be in conformance with the requirements specified in Table 4.2-2. The results of each sampling examination of a steam generator shall be classified into the following three categories:

Category C-1: less than 5% of the total number of tubes examined are degraded but none are defective.

Category C-2: Between 5% and 10% of the total number of tubes examined are degraded, but none are defective or one tube to not more than 1% of the sample is defective.

Category C-3: More than 10% of the total number of tubes examined are degraded, but none are defective or more than 1% of the sample is defective.

In the first sample of a given steam generator during any inservice inspection, degraded tubes not beyond the plugging limit detected by the prior examinations in that steam generator shall be included in the above percentage calculations, only if these tubes are demonstrated to have a further wall penetration of greater than 10% of the nominal tube wall thickness.

(c) Tubes shall be selected for examination primarily from those areas of the tube bundle where service experience has shown the most severe tube degradation.

- (d) The tubes examined in a given steam generator during the first examination of any inservice inspection shall include all non-plugged tubes in that steam generator that from prior examination were degraded, plus additional tubes as required to satisfy the minimum sample size specified in Table 4.2-2. If any selected tube does not permit 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. This information shall be included in the report required by Specification 4.2.5.3.2.
- (e) During the second and third sample examinations of any inservice inspection, the tube inspection may be limited to those sections of the tube lengths where imperfections were detected during the prior examination.
- (f) During subsequent inservice inspections, the tube inspection may be limited to certain areas of the tube sheet array and those sections of the tube lengths where imperfections were detected during previous inservice inspections.

4.2.5.1.3 Examination Method and Requirements

Steam generator tubes shall be examined in accordance with the method prescribed in Appendix IV, "Eddy Current Examination of Non-Ferromagnetic Steam Generator Heat Exchanger Tubes," as contained in ASME Boiler and Pressure Vessel Code - Section IX - "Inservice Inspection of Nuclear Power Plant Components."

4.2.5.1.4 Inspection Intervals

- (a) Inservice inspections shall not be more than 24 calendar months apart, except that reduced or tightened inspection intervals shall be governed as specified in 4.2.5.4(c) and (d).
- (b) The inservice inspections may be scheduled to be coincident with refueling outages or any plant shutdown, provided the inspection intervals of 4.2.5.1.4(a), (c) or (d), as applicable, are not exceeded.
- (c) If two consecutive inservice inspections covering a time span of at least 12 months yield results that fall in C-1 category, the inspection frequency may be extended to 40 month intervals between inspections.
- (d) If the results of the inservice inspection of steam generator tubing conducted in accordance with Table 4.2-2 at 40 month intervals fall in category C-3, the inspection frequency shall be reduced to at least once per 20 months. The increase in inspection frequency shall apply until a subsequent inspection meets the conditions specified in 4.2.5.1.4(c) and the interval can be extended to a 40 month period.

- (e) Unscheduled inspections shall be conducted in accordance with Specification 4.2.5.1.2 on any steam generator with primary-to-secondary tube leakage (not including leaks originating from tube-to-tube sheet welds) exceeding Specification 3.1.5.3.

All steam generators shall be inspected before returning to power in the event of a seismic occurrence greater than an operating basis earthquake, a LOCA requiring actuation of engineered safeguards, or a main steam line or feedwater line break.

4.2.5.1.5 Acceptance Limits

Definitions:

Imperfection is an exception to the dimension, 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.

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

Degraded Tube is a tube that contains imperfections caused by degradation equal to or greater than 20% of the nominal tube wall thickness.

Defect is an imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective.

Plugging Limit is the imperfection depth beyond which a degraded tube must be removed from service by plugging, because the tube may become defective prior to the next scheduled inspection of that tube. The plugging limit is 47% of the nominal tube wall thickness if the next inspection interval of that tube is 12 months, and a 2% reduction in the plugging limit for each 12 month period until the next inspection of the inspected steam generator.

4.2.5.2 Corrective Measures

All tubes that leak or are determined to have degradation exceeding the plugging limit shall be plugged prior to return to power.

4.2.5.3 Reports

1. After each inservice examination, the number of tubes plugged in each steam generator shall be reported to the Commission in accordance with Specification 6.9.2.a(3).

2. The complete results of the steam generator tube inservice inspection shall be included in the operating Report for the period in which the inspection was completed.

Reports shall include:

- (a) Number and extent of tubes inspected
 - (b) Location and percent of wall thickness penetration for each eddy current indication and any leaks.
 - (c) Identification of tubes plugged.
3. All results in Category C-3 of Table 4.2.2 shall be reported to the Commission as a prompt notification of Specification 6.9.2.a prior to resumption of plant operation. The written follow-up shall provide a description of investigations conducted to determine cause of the tube degradation and corrective measures taken to prevent recurrence.

Basis:

The inspection program, where practical, is in compliance with Section XI of the ASME Code for In-service Inspection of Nuclear Reactor Coolant Systems dated January, 1970. Though examinations in certain areas are desirable, it should be recognized that equipment and techniques to perform the inspection are still in development. In all areas scheduled for volumetric examination, a detailed pre-service mapping will be conducted using techniques anticipated to be used for post-operation examinations. The areas indicated for inspection represent those of representative stress levels and therefore will serve to indicate potential problems before significant flaws develop there or at other areas. As more experience is gained in operation of pressurized-water reactors, the time schedule and location of inspection may be altered or, should new techniques be developed, consideration may be given to incorporate these new techniques into this inspective program.

The use of conventional nondestructive, direct visual and remote visual test techniques can be applied to the inspection of most primary loop components except the reactor vessel. The reactor vessel presents special problems because of the radiation levels and the requirement for remote underwater accessibility to this component. Because of these limitations on access to the reactor vessel, several steps⁽¹⁾ have been incorporated into the design and manufacturing procedures in preparation for nondestructive test techniques which may be available in the future.

The techniques anticipated for in-service inspection include visual inspections, ultrasonic, radiographic, magnetic particle and dye penetrant testing of selected parts during refueling periods.

As more experience is gained in operation of this and other pressurized water reactors, the time schedule and location of examination might alter.

The primary pressure boundary covered by this inspection will include the primary reactor coolant system and branch lines 2" or greater from the reactor coolant system to the second design isolation valve. Credit is taken in the design of this plant for check valves.

In addition to the capsules discussed above, there are three spares. Two are located at the same location as Capsule No. 5 and one is located at the same location as Capsule No. 4

The Surveillance Requirements for inspection of the steam generator tubes ensure that the structural integrity of this portion of the RCS will be maintained. The program for inservice inspection of steam generator tubes is based on a modification of Regulatory Guide 1.83, Revision 1. Inservice inspection of steam generator tubing is essential in order to maintain surveillance of the conditions of the tubes for evidence of mechanical damage or progressive degradation. Inservice inspection of steam generator tubing also provides a means of characterizing the nature and cause of any tube degradation so that corrective measures can be taken.

Wastage-type defects will be minimized with proper chemistry treatment of the secondary coolant. If defects or significant degradations should develop in service, this condition is expected to be detected during inservice steam generator tube examinations. Plugging will be required for all tubes with imperfections exceeding the plugging limit. Steam generator tube inspections by means of eddy current testing have demonstrated the capability to reliably detect degradation that has penetrated 20% of the original tube wall thickness.

Whenever the results of any steam generator tubing inservice inspection fall into Category C-3, these results will be promptly reported to the Commission pursuant to Specification 6.9.2.a prior to resumption of plant operation. Such cases will be considered by the Commission on a case-by-case basis and may result in a requirement for analysis, laboratory examinations, tests, additional eddy-current inspection, and revision of the Technical Specifications.

References

- (1) FSAR, Section 4.4
- (2) FSAR, Volume 4, Tab VII, Question VI.C

TABLE 4.2-2

STEAM GENERATOR TUBE INSPECTION
H. B. ROBINSON UNIT NO. 2

1ST SAMPLE EXAMINATION			2ND SAMPLE EXAMINATION		3RD SAMPLE EXAMINATION	
Sample Size	Result	Action Required	Result	Action Required	Result	Action Required
A minimum of S tubes per Steam Generator (S.G.) $S=3(N/n)\%$ where: N is the number of steam genera- tors in the plant = 3 n is the number of steam genera- tors inspect- ed during an examination	C-1	Acceptable for Continued Service	N/A	N/A	N/A	N/A
	C-2	Plug tubes exceeding the plugging limit and proceed with 2nd sample examination of 2S tubes in same steam generator	C-1	Acceptable for continued Service	N/A	N/A
			C-2	Plug tubes exceeding the plugging limit and proceed with 3rd sample examination of 4S tubes in same steam generator	C-1	Acceptable for Continued Service
					C-2	Plug tubes exc. plug limit. Acceptable for continued service
					C-3	Perform action required under C-3 of 1st sample examination
			C-3	Perform action required under C-3 of 1st sample examination	N/A	N/A
	C-3	Inspect all tubes in this S.G., plug tubes exceeding the plugging limit and proceed with 2nd sample examination of 2S tubes in each other steam generator not included in the inservice inspection program. Report results to NRC within 24 hours in accordance with Technical Specification 6.9.2.a(3).	All other S. G.s are C-1	Acceptable for Continued Service	N/A	N/A
			Some S. G.s C-2 but no additional S. G. are C-3	Perform action required under C-2 of 2nd sample examination above	N/A	N/A
			Additional S. G. is C-3	Inspect all tubes in S.G. and plug tubes exceeding the plugging limit. Report to NRC within 24 hours in accordance with Technical Specification 6.9.2.a(3).	N/A	N/A

4.2-25

Amendment No. 44



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 44 TO FACILITY LICENSE NO. DPR-23

CAROLINA POWER AND LIGHT COMPANY

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

DOCKET NO. 50-261

Introduction

By letter dated November 4, 1976, as supplemented June 30, 1977, July 29, 1977, June 9, 1978, August 9, 1978 and April 9, 1979, Carolina Power and Light Company (the licensee) requested changes to the Technical Specifications appended to Facility Operating License No. DPR-23 for H. B. Robinson Unit No. 2. The proposed changes would establish inservice surveillance requirements for steam generator tubes.

Discussion

On September 14, 1976, we requested that the licensee submit proposed Technical Specification changes that would establish requirements for a program of steam generator tube inspection. To provide guidance in developing an inspection program at that time, the licensee was to refer to Regulatory Guide 1.83, "Inservice Inspection of Pressurized Water Reactor Steam Generator Tubes", dated June 1974 (R.G. 1.83). The licensee submitted a program for H. B. Robinson Unit No. 2 on September 24, 1974. However, we made a decision to delay requiring Technical Specification incorporation of the program at that time because of a need to revise R.G. 1.83 to reflect developments in the state of the art of steam generator tube inspection techniques and to more directly take into account the inspection experience that was being gained at operating plants. In making that decision we took into account the industry wide practice which already included voluntary inspection of steam generator tubes that in many respects was comparable to inspections that R.G. 1.83 specified. Revision 1 to R.G. 1.83 was issued after receiving comments from the industry. By letter dated November 4, 1976, the licensee proposed Technical Specifications which reflect the provisions of R.G. 1.83, Revision 1. The Technical Specifications proposed for H. B. Robinson Unit 2 tube inspections are, therefore, in agreement with those provisions.

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Certain revisions of the proposed Technical Specifications were necessary to meet our requirements. These changes have been discussed with the licensee and, as agreed, have been incorporated into this amendment.

I. Evaluation - Steam Generator Inspection Program

Surveillance Requirements for Steam Generator Tubes

Structures, systems, and components important to safety of a nuclear power plant are designed, fabricated, constructed, and tested so as to provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public. To continuously maintain such assurance, General Design Criterion 32 requires that components which are part of the reactor coolant pressure boundary (RCPB) be designed to permit periodic inspection and testing of important areas and features to assess their structural and leaktight integrity. The steam generator tubing is part of the RCPB and is an important part of a major barrier against fission product release to the environment. It also acts as a barrier against steam release to the containment in the event of a Loss of Coolant Accident (LOCA). For this reason, a program of periodic inservice inspection is being established to assure the continued integrity of the steam generator tubes over the service life of the plant.

Generally, the major elements of the steam generator tube inservice inspection program consist of specified: (a) sample selection, (b) examination methods, (c) inspection intervals, (d) acceptance criteria, and (e) reporting requirements. Each of these major elements of the program is separately evaluated below.

1. Sample Selection

The proposed sampling is generally patterned after R.G. 1.83, Rev.1, "Inservice Inspection of Pressurized Water Reactor Steam Generator Tubes". However there are some deviations from R.G. 1.83 that we require to improve the program and/or reduce the potential radiation exposure of personnel who perform the inspections. The licensee's program includes these additional requirements. Deviations from R.G. 1.83 supplementary sampling requirements are evaluated below:

- a. Regulatory Position C.5.a, "Supplementary Sampling Requirements" recommends that if the eddy current inspection results during an inservice inspection indicate any tubes with previously undetected imperfections of 20% or greater depth, additional steam generators, if any, should be inspected. In other words, because of a single tube in one steam generator with previously undetected imperfection of 20% or greater depth but still well below the plugging limit, all steam generators in the plant should be inspected. Although

the detection of any defect warrants further inspection to determine the extent of degradation in the steam generators, we believe that this inspection should be expanded initially to determine the extent of any further degradation in the one steam generator under inspection. If the expanded inspection indicates more extensive defect conditions, then expansion to the other steam generator is required. This approach will provide careful stepwise expansion of inspection based on the results of successive steps, while tending to minimize the exposure of inspection personnel resulting from initial positioning of inspection equipment in a steam generator. This inspection approach, as specified in the licensee's proposed Technical Specifications, is appropriate for this facility in which system characteristics are such that both steam generators are expected to perform in a similar manner.

- b. Revision 1 of R.G. 1.83 requires additional inspections if the initial inspection results indicate that more than 10% of the inspected tubes have detectable wall penetration of greater than 20% or that one or more tubes inspected have an indication in excess of the plugging limit. The additional inspections require a complete tube inspection of an additional 3% and, if required, a third inspection of 6% of the tubes. The requirements set forth in the proposed Technical Specifications are acceptable because they require a second inspection doubling the number of tubes inspected in the first sample if 5% of the tubes show degradation of 20% wall thickness or more. Again, if more than 5% in the second sample of the tubes show a detectable penetration greater than 20% or 1% are defective tubes, a third sample is required again doubling the number of tubes inspected in the second sample. In the first sample, sampling is to concentrate on areas of the tube array where prior inspections or experience have indicated potential problems, and full length traverse of each inspected tube is required. For a second or third sample, if required, the inspection may concentrate on areas of the tube array and portions of the tube in which the first sample or the second sample indicated potential problems.

Based on the considerations discussed above, we have concluded that the sample selection scheme proposed by the licensee is acceptable.

2. Examination Method

The proposed examination methods include nondestructive examination by eddy current testing. The specified methods are capable of locating and identifying stress corrosion cracks and tube wall thinning from chemical wastage, mechanical damage or other causes. Based on our review of these methods and experience gained using these methods by the industry, we have concluded that the examination methods are acceptable.

3. Inspection Intervals

The proposed inspection intervals are compatible with those recommended in R.G. 1.83, Revision 1, and thus, are acceptable.

4. Acceptance Criteria

The licensee has submitted tabulated eddy current inspection results showing the mean defect growth (percent of tube wall thickness) between consecutive inspections as a function of the date of the later inspection. The earliest inspection considered was performed in May, 1974, since that was when the onset of thinning was observed. In order to minimize the errors associated with small eddy current indications, the licensee subsequently provided the same type of data considering only those tubes indicating $\geq 30\%$ wall thinning. Additionally, mean and standard deviations were calculated for the three inspections of each steam generator, for all three generators combined, and for all three inspections combined. For all three inspections combined, a mean growth of 0.78% of tube wall per year with a standard deviation of $\pm 8.17\%$ was calculated. Including tubes with indications between 20% and 30%, the plant average was calculated to be 1.17% per year. The licensee assumes a tube thinning rate of 2% per year in order to envelope this calculated value.

Minimum acceptable tube wall thickness calculations have been performed for the licensee by Westinghouse. A summary of the calculations shows that under normal operating conditions, assuming a factor of safety of 3 for the full range of normal operating pressure differentials, a minimum wall thickness of 0.023 inch is required. For postulated accident conditions, a minimum tube wall thickness of 0.017 inch and 0.021 inch is required under MSLB + SSE and LOCA + SSE conditions, respectively. Criteria utilized in preparing these calculations is taken from Regulatory Guide 1.121, "Bases for Plugging Degraded PWR Steam Generator Tubes".

Regulatory Guide 1.121 states, as a tube plugging criteria, that any tube indicating a defect depth greater than the maximum allowable defect minus an operating allowance should be plugged or repaired. Further, the guide specifies that the operating allowance should include a margin for error in eddy current testing and an additional percentage of wall thickness to ensure that the maximum allowable defect depth is not exceeded during operation prior to the next inspection. The licensee, in determining the plugging limit, has used an operating allowance of 2% per year. In determining the required minimum tube

wall thickness, the licensee takes exception to applying a factor of safety of 3 during the full range of normal operating pressure differentials. The licensee states that the requirement, which essentially duplicates the ASME Code Section III requirements for the design of new tubes, cannot realistically be applied to partially degraded tubes. CP&L stated that the requirement is restrictive since it does not recognize the reinforcing effect of limited axial length thinning demonstrated in laboratory tests. CP&L further stated that postulated accident conditions, rather than normal operating conditions, should govern the plugging criteria. The licensee proposes an alternate factor of safety of 2 which would require a 0.016 inch wall thickness.

Based on the above reasoning, the licensee examines the required wall thicknesses for the postulated accident conditions. The licensee states that since a situation in which the tube is uniformly thinned along the axis of the tube for a length exceeding two diameters has not been observed, the calculated required wall thickness of 0.021 inch needed during a postulated LOCA + SSE should not be the limiting case.

The minimum acceptable tube wall thickness finally arrived at and used by the licensee in determining the plugging limit is 0.020 inch. A tube with 0.020 inch of remaining wall ensures that the general primary membrane stress intensity, under normal operating pressure differentials, remains below the materials yield strength at 600°F. This structural requirement of 0.020 inch, or 40% of the tube wall thickness, is added to the mean thinning rate of 2% per year resulting in a minimum acceptable tube wall thickness of 42%. This results in a plugging limit of 58%. However, the licensee states that an additional allowance of 8% is added to provide extra conservatism and, hence, a plugging limit of 50% was recommended.

We have reviewed the results of the licensee's steam generator tube inspections, minimum acceptable tube wall thickness calculations and criteria, and plugging limit determination. Results of the four most recent eddy current inspections indicate that 2% per year is a reasonable tube thinning rate.

The licensee's position is that a factor of safety of 3 against tube burst during normal operation is unnecessary. Although we do not agree with that position, we feel that the licensee's calculation showing a minimum tube wall of 0.023 inch required to maintain a factor of safety of three is indeed conservative. Based on preliminary results of independent tests on steam generator tube burst being performed for the NRC, the required safety factor can be maintained at a wall thickness less than the 0.021 inch required for the LOCA + SSE condition.

As discussed above, the licensee believes the calculated required wall thickness of 0.021 inch for the SSE + LOCA loading condition is not realistic, and has used 0.020 inch for calculating a proposed 50% plugging limit.

Since we do not concur with the licensee's position that 0.021 inch minimum tube thickness is unrealistic, we require that this minimum thickness be maintained. Further, to account for statistical scatter in inspection data and uncertainties in the eddy current testing technique, an additional 9% shall be included in the plugging limit calculation. Adding this 9% to the required minimum tube wall thickness of 42% (0.021 inch) gives plugging limit based on a minimum wall thickness of 51% plus 2% per year degradation or thinning allowance rate between inspections. This results in a plugging limit of 47% for an inspection interval of 12 months, 45% for 24 months, etc. Based on the discussion and evaluation above, we conclude that these tube plugging limits are reasonably conservative and therefore, are acceptable for the H. B. Robinson Unit 2 steam generators. We have discussed these plugging limits with the licensee and the licensee agrees with the staff's position.

5. Reporting of Inspection Results

Regulatory Position C.7.d of R.G. 1.83 states that a licensee should report to the Commission, for resolution and approval, proposed remedial action if the inspection results exceed the limits specified in the Guide. It also states that additional sampling and more frequent inspection may be required. The proposed Technical Specifications clearly specify additional inspections the licensee must perform for those inspection results that fall in Technical Specification Categories C-1 and C-2. Immediate reporting of these results would not be required. Immediate reporting would be required only if the inspection results fall into the most severe Category, C-3, as described in Table 3.8 of the Technical Specifications.

We conclude that the above described reporting requirements, as proposed by the licensee and modified by us, are reasonable and will facilitate reporting of pertinent information without unnecessarily increasing plant downtime, and thus constitute an acceptable alternative method for meeting NRC reporting requirements.

II. Summary - Steam Generator Inspection Program

In summary, we have concluded that the proposed steam generator tube inservice inspection program will provide added assurance of the continued integrity of the steam generator tubes, and thus is acceptable.

Environmental Consideration

We have determined that the amendment does 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 have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR Section 51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, 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 this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: November 17, 1979

UNITED STATES NUCLEAR REGULATORY COMMISSIONDOCKET NO. 50-261CAROLINA POWER AND LIGHT COMPANYNOTICE OF ISSUANCE OF AMENDMENT TO FACILITY
OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 44 to Facility Operating License No. DPR-23, issued to the Carolina Power and Light Company, (the licensee), which revised Technical Specifications for operation of the H. B. Robinson Steam Electric Plant Unit No. 2 (the facility) located in Darlington County, Hartsville, South Carolina. The amendment is effective as of the date of its issuance.

The amendment establishes Technical Specifications to assure inspection and reporting requirements for a program of inservice inspection of steam generator tubing consistent with the requirements of Revision 1 of Regulatory Guide 1.83.

The application for the amendment complies 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 amendment. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

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

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For further details with respect to this action, see (1) the application for amendment dated November 4, 1976, as supplemented June 30, July 29, 1977, June 4, August 9, 1978 and April 9, 1979, (2) Amendment No. 44 to License No. DPR-23, 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 Hartsville Memorial Library, Home and Fifth Avenues, Hartsville, South Carolina. 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 Operating Reactors.

Dated at Bethesda, Maryland, this 17th day of November, 1979.

FOR THE NUCLEAR REGULATORY COMMISSION



A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors