NRC FORM 195 (2-76)

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ENCLOSURE
REQUEST FOR LICENSE AMENDEMNT- REVISION TO TECH. SPEC. TO ASSURE INSPECTION AND REPORTING REQUIREMENTS FOR A PROGRAM OF IN-SERVICE INSPECTION OF STEAM GENERATOR TUBING CONSISTENT WITH THE REQUIREMENTS OF REVISION # 1.....

(3 SIGNED CYS. RECEIVED)
(11 PAGES)

PLANT NAME: H.B. ROBINSON # 2

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FOR ACTION/INFORMATION — SAB 11-8-76

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NRC FORM 195 (2-76)

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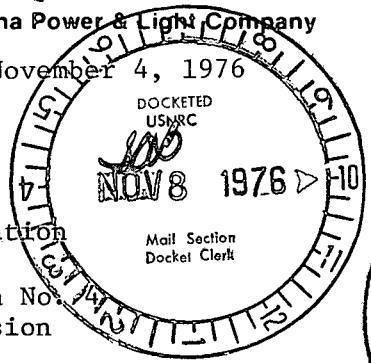
Carolina Power & Light Company

November 4, 1976



FILE: NG-3514(R)

SERIAL: NG-76-1467

Office of Nuclear Reactor Regulation
ATTN: Robert W. Reid, Chief
Operating Reactors Branch No. 4
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

H. B. ROBINSON UNIT NO. 2
FACILITY OPERATING LICENSE NO. DPR-23
DOCKET NO. 50-261
REQUEST FOR LICENSE AMENDMENT - REVISION OF TECHNICAL SPECIFICATIONS

Dear Mr. Reid:

In accordance with the Code of Federal Regulations, Title 10, Part 50.90 and Part 2.101, and in response to your request of September 14, 1976, Carolina Power & Light Company hereby submits a proposed revision to the Technical Specifications for its H. B. Robinson Unit No. 2. The revision establishes Technical Specifications to assure inspection and reporting requirements for a program of in-service inspection of steam generator tubing consistent with the requirements of Revision 1 of Regulatory Guide 1.83, and as a result supersedes our previous request of September 24, 1974, on the same subject.

The proposed revision, which is attached in the form of page changes to the H. B. Robinson Technical Specifications, has been revised slightly from the model Technical Specifications presented in the September 14, 1976, letter to be consistent with the format of our specifications and to more clearly delineate the inspection requirements as they pertain to the plant. We consider that, based on the numerous inspections that have been performed under the guidance of Regulatory Guide 1.83 and reported in letters and Operating Reports over the past four years, the inspection we will be performing during the November refueling outage will qualify as the "First In-service Inspection" alluded to in your model Technical Specification Table 4.4-1. We have also revised the plugging limit from 40% of nominal tube wall thickness to 50% of nominal tube wall thickness. This is based on our plant operation with phosphate chemistry instead of AVT, and by the slow rate of tube degradation noted by our inspections over the past several years. Justification that this plugging limit is suitable to maintain tube integrity during a combined loss of coolant accident and safe shutdown earthquake, allowing for operational degradation between inspections, has been provided in our submittal of July 10, 1974. In addition, Technical Specification 4.7.2 requires periodic pressure testing of the steam generators to assure integrity. This pressure testing has never revealed primary-to-secondary leakage as a result of tube failure. As a result, Carolina Power & Light Company believes that the plugging limit of 50% nominal tube wall thickness is appropriate.

336 Fayetteville Street • P. O. Box 1551 • Raleigh, N. C. 27602

11315

As required by Commission regulations, this submittal is signed under oath by a duly authorized officer of the Company.

Yours very truly,

E. E. Utley
Vice President
Bulk Power Supply

DBW/dkm

Attachment

FRANKLIN MURRAY NOTARY PUBLIC WAKE COUNTY, N. C.

Sworn to and subscribed before me this 4TH day of NOVEMBER, 1976.

Franklin Murray
Notary Public

My Commission Expires: October 4, 1976.

3.1.5 LEAKAGE

3.1.5.1 If the primary system leakage exceeds 1 gpm and the source of leakage is not identified within 12 hours, the reactor shall be placed in the hot shutdown condition utilizing normal operating procedures. If the source of leakage exceeds 1 gpm and is not identified within 24 hours, the reactor shall be placed in the cold shutdown condition utilizing normal operating procedures.

3.1.5.2 If the sources of leakage have been identified and it is evaluated that continued operation is safe, operation of the reactor with a total leakage rate not exceeding 10 gpm shall be permitted. If leakage exceeds 10 gpm, the reactor shall be placed in the hot shutdown condition within 12 hours utilizing normal operating procedures. If the leakage exceeds 10 gpm for 24 hours, the reactor shall be placed in the cold shutdown condition utilizing normal operating procedures.

3.1.5.3 If the leakage is determined to be primary to secondary steam generator leakage in excess of 0.35 gpm in any steam generator, or in excess of 1 gpm total for all three steam generators, the reactor shall be shutdown and the plant placed in the cold shutdown conidtion utilizing normal procedures within 30 hours after detection.

Basis:

Leakage from the Reactor Coolant System is collected in the containment or by the other closed systems. These closed systems are: the Steam and Feedwater System, the Waste Disposal System, and the Component Cooling System. Assuming the existence of the maximum allowable activity in the reactor coolant, the rate of 1 gpm unidentified leakage is a conservative limit on what is allowable before the guidelines of 10 CFR Part 20 would be exceeded. This is shown as follows: If the reactor coolant activity is $50/\bar{E}$ uCi/cc ($\bar{E}$ = average beta plus gamma energy per disintegration in Mev) and 1 gpm of leakage is assumed to be discharged through the air ejector, the yearly whole body dose resulting from this activity at the site boundary, using an annual average $X/Q = 2.00 \times 10^{-5}$ sec/m^3 is about the 10 CFR Part 20 guideline of 0.5 R/yr[1,2].

With the limiting reactor coolant activity and assuming initiation of 1 gpm leak from the Reactor Coolant System to the Component Cooling System, the radiation monitor in the component cooling pump inlet

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.

(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

(a) Steam generator tubes shall be examined in accordance with the method prescribed in Article 8 - "Eddy Current Examination of Tubular Products", as contained in ASME Boiler and Pressure Vessel Code - Section V - "Nondestructive Examination".

(b) The examination method of 4.2.5.1.3(a) shall apply until Appendix IV, "Eddy Current Examination Method of Non-Ferromagnetic Steam Generator Heat Exchanger Tubes" is incorporated and become effective rules of the ASME Boiler and Pressure Vessel Code, Section XI - Inservice Inspection of Nuclear Power Plant Components. At that time, the rules of ASME Code, Section XI shall be used in lieu of 4.2.5.1.3(a).

4.2.5.1.4 Inspection Intervals

(a) Inservice inspections shall not be more than 24 calendar months apart.

(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) 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 with a maximum of 50 months between inspections.

(d) If the results of the inservice inspection of steam generator tubing conducted in accordance with Table 4.2-2 requires that a third sample examination must be performed, and the results of this fall in category C-3, the inspection frequency shall be reduced to 20 month intervals with a maximum of 25 months between inspections. The reduction shall apply until a subsequent inspection demonstrates that a third sample examination is not required.

(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 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

(a) 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 greater than 20% of the nominal tube wall thickness.

Defect is an imperfection of such severity that it exceeds the minimum acceptable tube wall thickness of 50%. A tube containing a defect is defective.

Plugging Limit is the imperfection depth beyond which the tube must be removed from service, because the tube may become defective prior to the next scheduled inspection. The plugging limit is 50% of the nominal tube wall thickness.

4.2.5.2 Corrective Measures

All tubes that leak or have degradation exceeding the plugging limit shall be plugged prior to return to power from a refueling or inservice inspection condition.

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 all thickness penetration for each indication

   (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 inspection program.

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 generators in the plant = 3 n is the number of steam generators inspected 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 essentially 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).	C-1 in other S.G.	Acceptable for Continued Service	N/A	N/A
			C-2 in other S.G.	Perform action required under C-2 of 2nd sample examination above	N/A	N/A
			C-3 in other S.G.	Inspect essentially 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