

March 31, 1987

*See Correction letter  
of 5/22/87*

Docket No. 50-261

Mr. E. E. Utley, Senior Executive Vice President  
Power Supply and Engineering & Construction  
Carolina Power and Light Company  
Post Office Box 1551  
Raleigh, North Carolina 27602

Dear Mr. Utley:

The Commission has issued the enclosed Amendment No. 113 to Facility Operating License No. DPR-23 for the H. B. Robinson Steam Electric Plant Unit No. 2. This amendment consists of changes to the Technical Specifications in response to your request dated December 18, 1986.

The amendment revises the Technical Specifications by replacing the existing heatup and cooldown curves in Figures 3.1-1 and 3.1-2, respectively, with two sets of curves. The replacement curves are applicable for up to 12.5 and 15 effective full power years (EFPY), respectively.

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

Sincerely,

Glode Requa, Project Manager  
PWR Project Directorate #2  
Division of PWR Licensing-A  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 113 to DPR-23
2. Safety Evaluation

cc: w/enclosures  
See next page

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Mr. E. E. Utley  
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H. B. Robinson 2

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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. 113  
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 December 18, 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, 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:

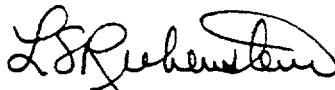
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(B) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 113, 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



Lester S. Rubenstein, Director  
PWR Project Directorate #2  
Division of PWR Licensing-A  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: March 31, 1987

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 113 FACILITY OPERATING LICENSE NO. DPR-23

DOCKET NO. 50-261

Revise Appendix A as follows:

Remove Pages

3.1-21

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3.1-22

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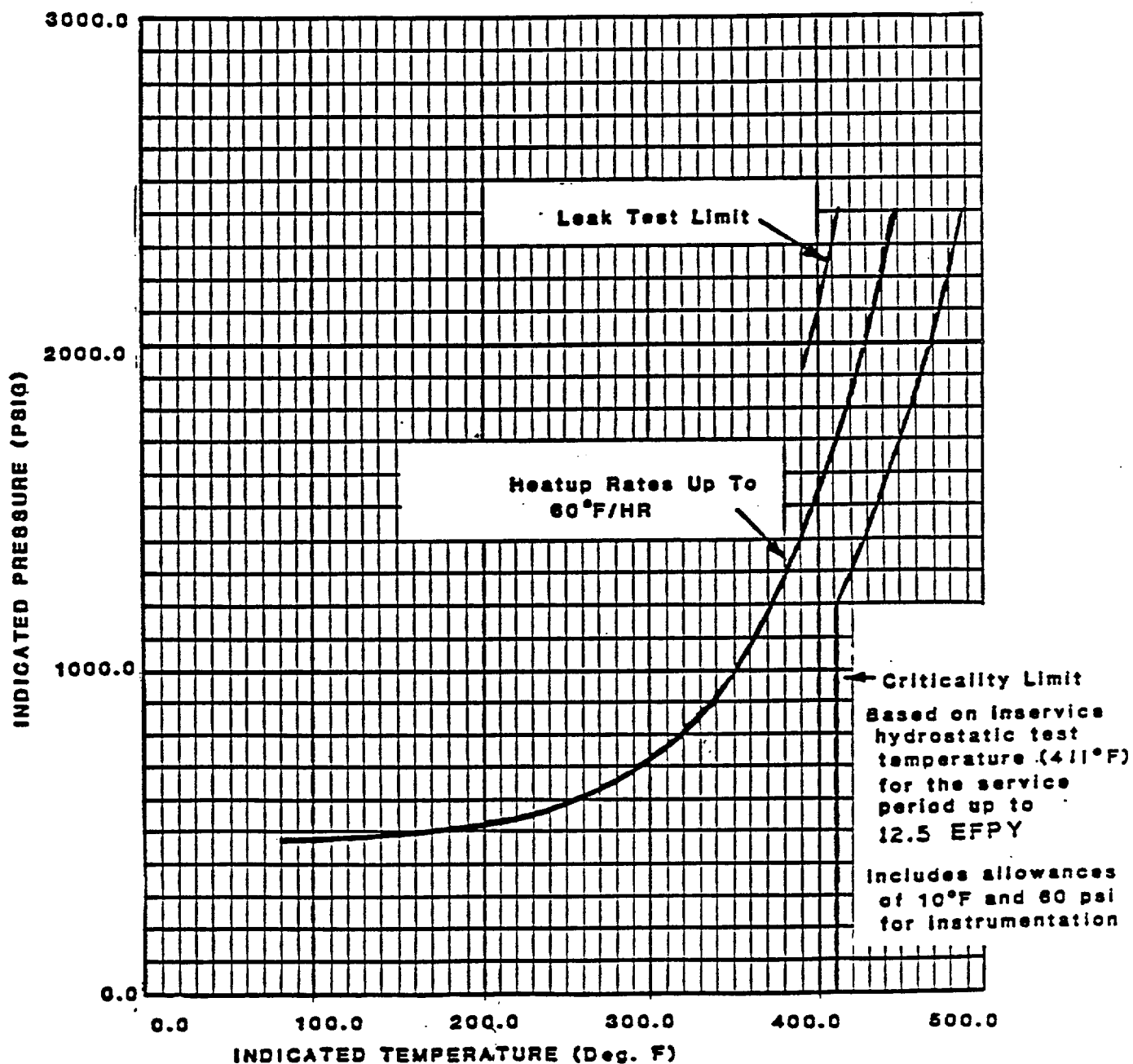
Insert Pages

3.1-21

3.1-21.a

3.1-22

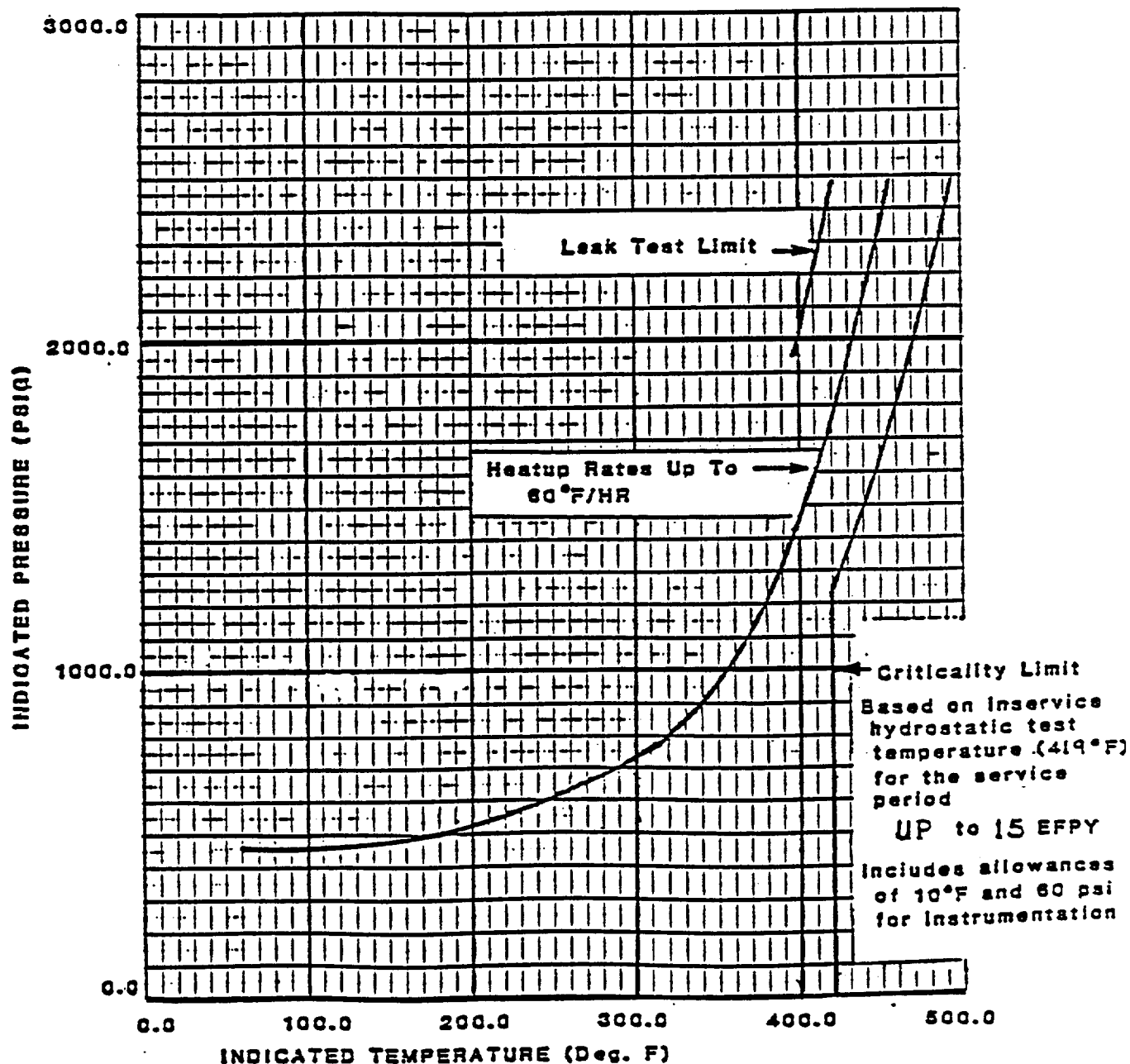
3.1-22.a



H.B. ROBINSON Unit #2  
Carolina  
Power & Light Company  
Technical Specifications

Reactor Coolant System  
Heatup Limitations - Applicable  
Up To 12.5 EFPY

FIGURE  
3.1-1.a



H.B. ROBINSON Unit #2  
Carolina  
Power & Light Company  
Technical Specifications

Reactor Coolant System  
Heatup Limitations - Applicable  
Up To 15 EFPY

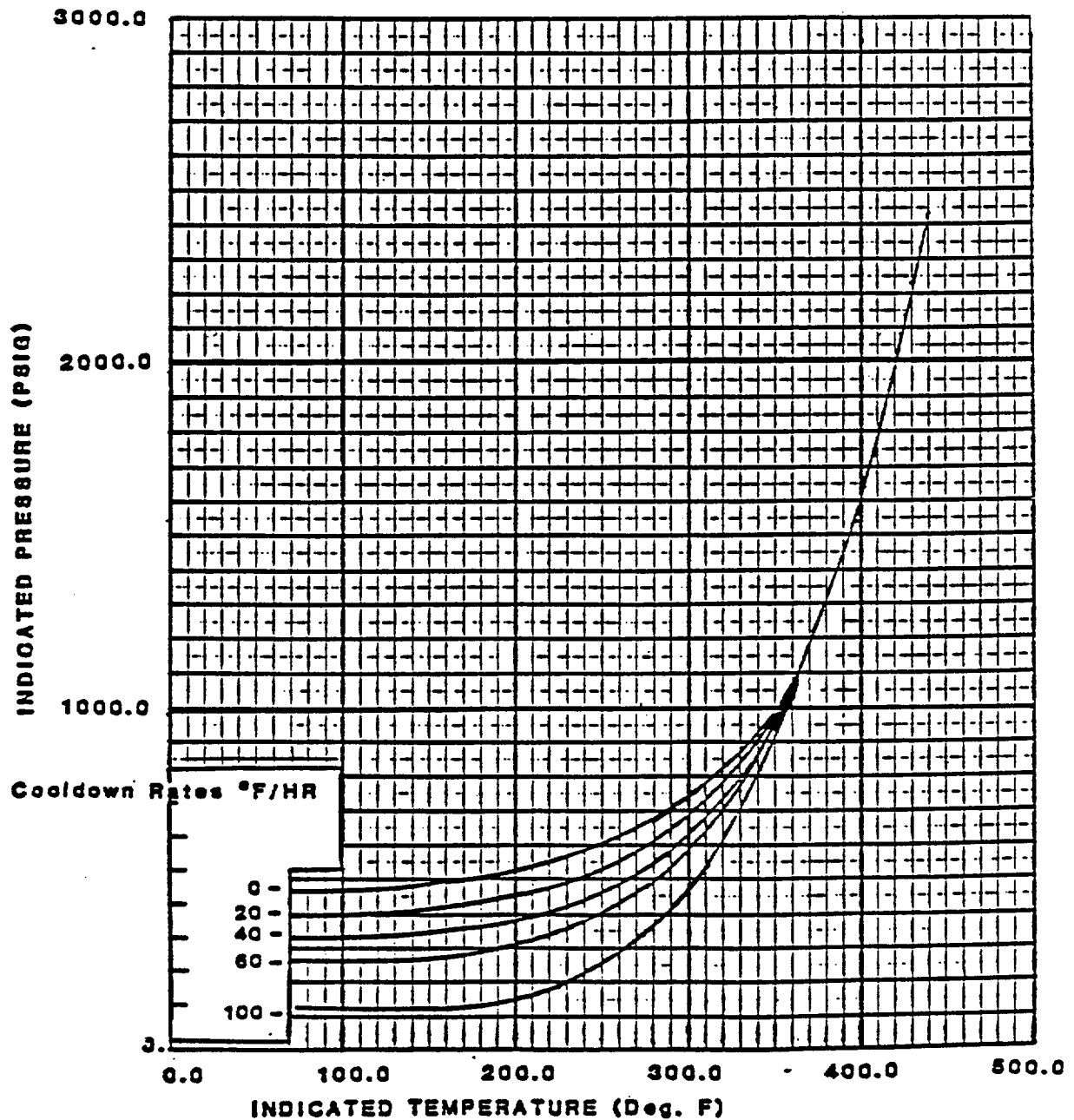
FIGURE  
3.1-1.b

# MATERIALS PROPERTIES BASIS

Controlling Material : Weld Metal  
 Copper Content : 0.35 wt.%  
 Phosphorus Content : 0.012 wt.%  
 RT<sub>NDT</sub> Initial : 0°F  
 RT<sub>NDT</sub> After 12.5 EFPY: 1/4 T, 282°F  
                               3/4 T, 139°F

Curves applicable for cooldown rates up to 100°F/HR for the service period up to 12.5 EFPY.

Includes 10° and 60 psi allowance for instrumentation.



H.B. ROBINSON Unit #2  
 Carolina  
 Power & Light Company  
 Technical Specifications

Reactor Coolant System  
 Cooldown Limitations  
 Applicable Up To 12.5 EFPY

FIGURE  
 3.1-2.a



# MATERIALS PROPERTIES BASIS

Controlling Material : Weld Metal

Copper Content : 0.35 wt.%

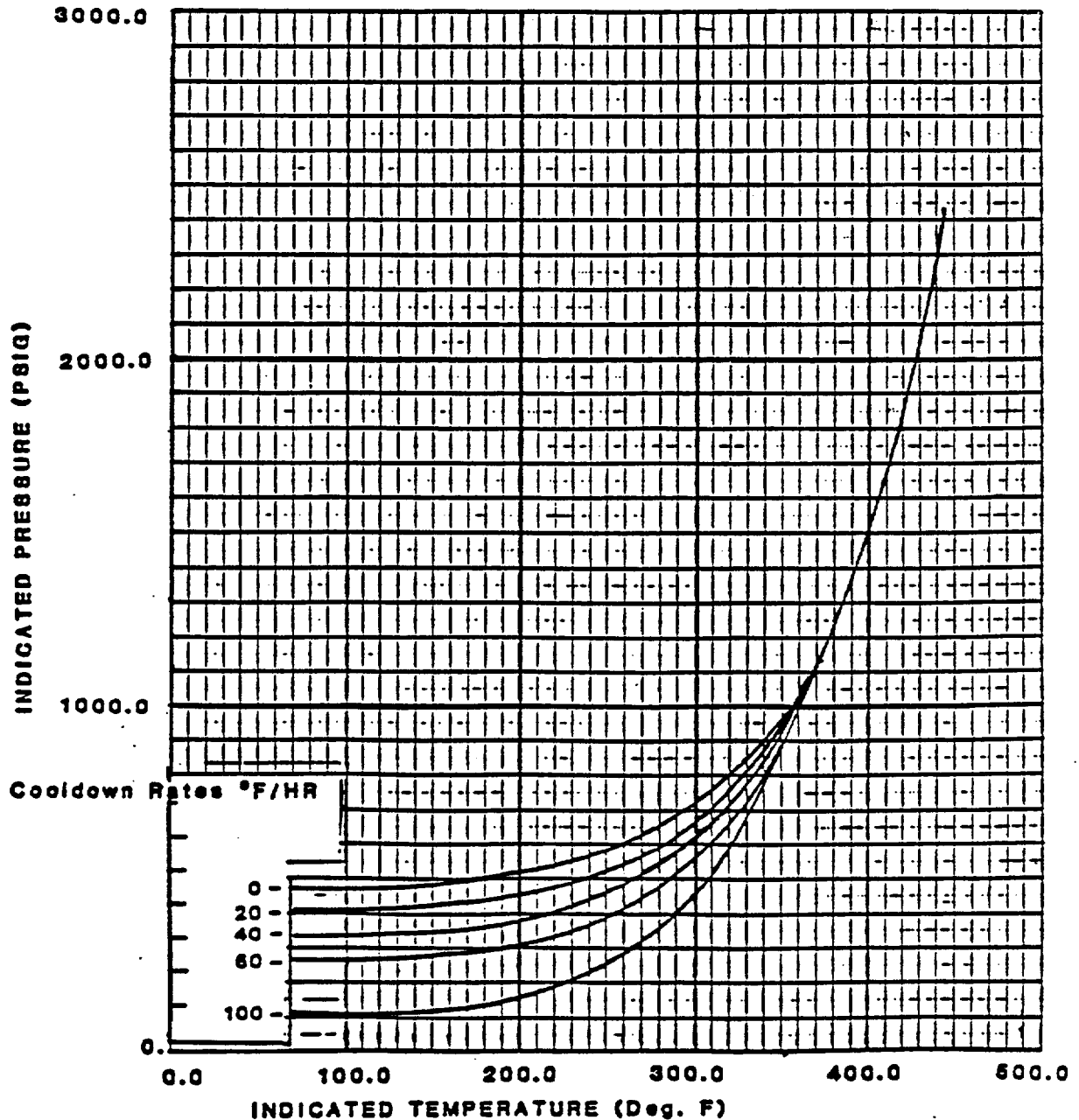
Phosphorus Content : 0.012 wt.%

RT<sub>NDT</sub> Initial : 0°F

RT<sub>NDT</sub> After 15 EFY: 1/4 T, 290°F  
3/4 T, 149°F

Curves applicable for cooldown rates up to 100°F/HR for the service period up to 15 EFY.

Includes 10° and 60 psi allowance for instrumentation.



H.B. ROBINSON Unit #2  
- Carolina  
Power & Light Company  
Technical Specifications

Reactor Coolant System  
Cooldown Limitations  
Applicable Up To 15 EFY

FIGURE  
3.1-2.b



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 113 TO FACILITY OPERATING LICENSE NO. DPR-23  
CAROLINA POWER AND LIGHT COMPANY  
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2  
DOCKET NO. 50-261

I. INTRODUCTION

By letter dated December 18, 1986, Carolina Power & Light Company (the licensee) submitted a request for revision to the Technical Specifications for the H. B. Robinson Steam Electric Plant Unit 2 (HBR-2). The proposed license amendment will incorporate new reactor vessel heatup and cooldown pressure-temperature limit curves which will replace the existing Figures 3.1-1 and 3.1-2, respectively. Two sets of curves applicable for up to 12.5 and 15 effective full power years (EFPY) were proposed. The bases for the proposed heatup and cooldown limits are the test results from the HBR-2 surveillance program (Reference 1) submitted for staff review in a letter from the licensee to the NRC dated August 19, 1983.

II. EVALUATION

Pressure-temperature limits must be calculated in accordance with the requirements of Appendix G, 10 CFR 50, which became effective on July 26, 1983. Pressure-temperature limits that are calculated in accordance with the requirements of Appendix G, 10 CFR 50, are dependent upon the initial reference temperature ( $RT_{NDT}$ ) for the limiting materials in the beltline and closure flange regions of the reactor vessel and the increase in  $RT_{NDT}$  resulting from neutron irradiation damage to the limiting beltline material. The licensee indicated that the initial  $RT_{NDT}$  for the limiting materials in the closure flange and beltline regions of the HBR-2 vessel were estimated using the method recommended by the staff in Branch Technical Position MTEB 5-2, "Fracture Toughness Requirements," which is documented in the Standard Review Plan, Section 5.3.2, "Pressure-Temperature Limits."

The limiting beltline material is the upper circumferential weld fabricated using RACO 3 wire (heat no. W5214) and Linde 1092 flux with nickel added. The licensee indicates that Branch Technical Position MTEB 5-2 results in an initial  $RT_{NDT}$  of  $0^{\circ}F$  for the limiting weld metal. The licensee indicates that the limiting closure flange region material is the vessel flange forging, in which the initial  $RT_{NDT}$  is estimated as  $40^{\circ}F$  (Reference 2).

The increase in  $RT_{NDT}$  resulting from neutron irradiation damage depends upon the predicted amount of neutron fluence and the rate of embrittlement of the limiting reactor vessel beltline material. The licensee indicated that the neutron fluence at the inside surface of the limiting weld was  $13.5 \times 10^{18}$  n/cm<sup>2</sup> at 7.48 EFPY, and that the subsequent rate of increase in fluence would be  $1.05 \times 10^{18}$  n/cm<sup>2</sup> per EFPY (Reference 2). For the limiting weld at the inside surface, this rate of increase in neutron fluence results in predicted neutron fluences of  $1.9 \times 10^{19}$  n/cm<sup>2</sup> and  $2.1 \times 10^{19}$  n/cm<sup>2</sup> at 12.5 and 15 EFPY, respectively.

The increase in  $RT_{NDT}$  resulting from neutron irradiation damage was estimated by the licensee according to Regulatory Guide 1.99 Rev. 1, "Effects of Residual Elements on Predicted Radiation Damage to Reactor Vessel Materials." Reference 2 contains a comparison of the observed increase in  $RT_{NDT}$  of the surveillance weld metal and that predicted according to Regulatory Guide 1.99 Rev. 1 for HBR-2. The surveillance material test results indicate that the increase in  $RT_{NDT}$  of the surveillance material is less than that predicted by Regulatory Guide 1.99 Rev. 1. The licensee indicates that the surveillance weld metal is the limiting weld material (Reference 3). Hence, the Regulatory Guide should provide a conservative estimate as to the amount of increase in  $RT_{NDT}$  resulting from neutron irradiation for the HBR-2 limiting reactor vessel beltline material.

The staff used the unirradiated  $RT_{NDT}$  for beltline and closure flange materials, which were previously discussed, the neutron fluence estimates of the licensee, the Regulatory Guide 1.99 Rev. 1 method of estimating neutron irradiation damage, and Standard Review Plan 5.3.2 method of calculating pressure-temperature limits to evaluate the licensee's proposed pressure-temperature limits. Our evaluation indicates that the proposed pressure-temperature limits in Figures 3.1-1.a and 3.1-2.a meet the safety margins of Appendix G, 10 CFR 50, for a period of time corresponding to 12.5 EFPY. Also, it indicates that the proposed pressure-temperature limits in Figures 3.1-1.b and 3.1-2.b meet the same safety margins for a period of time corresponding to 15 EFPY.

### III. SUMMARY

Based on the above discussion, the staff finds the proposed licensee amendment acceptable.

### IV. 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. 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 previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this 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 this amendment.

V. 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 this amendment will not be inimical to the common defense and security or to the health and safety of the public.

REFERENCES

- (1) Westinghouse Report WCAP-10304, "Analysis of Capsule T From the H. B. Robinson Unit 2 Reactor Vessel Radiation Surveillance Program," S. E. Yanichko, S. L. Anderson, R. P. Shogan, and R. G. Lott, March 1983.
- (2) Letter from G. Requa (NRC) to E. E. Utley (CP&L) dated September 4, 1984.
- (3) Letter from S. R. Zimmerman (CP&L) to NRC Document Control Desk dated January 16, 1987.

Dated: March 31, 1987

Principal Contributor:

S. Lee