

March 10, 1986

Docket No. 50-311

Mr. C. A. McNeill, Jr.  
Vice President - Nuclear  
Public Service Electric and Gas Company  
Post Office Box 236  
Hancocks Bridge, New Jersey 08038

Dear Mr. McNeill:

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The Commission has issued the enclosed Amendment No. 47 to Facility Operating License No. DPR-75 for the Salem Nuclear Generating Station, Unit No. 2. This amendment consists of changes to the Technical Specifications in response to your request dated October 15, 1984.

The amendment revises the Heatup Limits Curve and the Cooldown Limits Curve for Unit No. 2.

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

Sincerely,

/s/DFischer

Donald C. Fischer, Senior Project Manager  
PWR Project Directorate #3  
Division of PWR Licensing-A

Enclosures:

1. Amendment No. 47 to DPR-75
2. Safety Evaluation

cc: w/enclosures  
See next page

PAD-3  
CVogan *CV*  
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*M. Korman*  
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*[Signature]*  
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Mr. C. A. McNeill  
Public Service Electric & Gas Company      Salem Nuclear Generating Station

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

PUBLIC SERVICE ELECTRIC AND GAS COMPANY  
PHILADELPHIA ELECTRIC COMPANY  
DELMARVA POWER AND LIGHT COMPANY  
ATLANTIC CITY ELECTRIC COMPANY

DOCKET NO. 50-311

SALEM NUCLEAR GENERATING STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 47  
License No. DPR-75


1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Public Service Electric and Gas Company, Philadelphia Electric Company, Delmarva Power and Light Company and Atlantic City Electric Company (the licensees) dated October 15, 1984, 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 2.C.(2) of Facility Operating License No. DPR-75 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 47, 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

  
Steven A. Varga, Director  
PWR Project Directorate #3  
Division of PWR Licensing-A

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: March 10, 1986

ATTACHMENT TO LICENSE AMENDMENT NO. 47

FACILITY OPERATING LICENSE NO. DPR-75

DOCKET NO. 50-311

Revise Appendix A as follows:

Remove Pages

3/4 4-20

3/4 4-29

B 3/4 4-9

Insert Pages

3/4 4-20

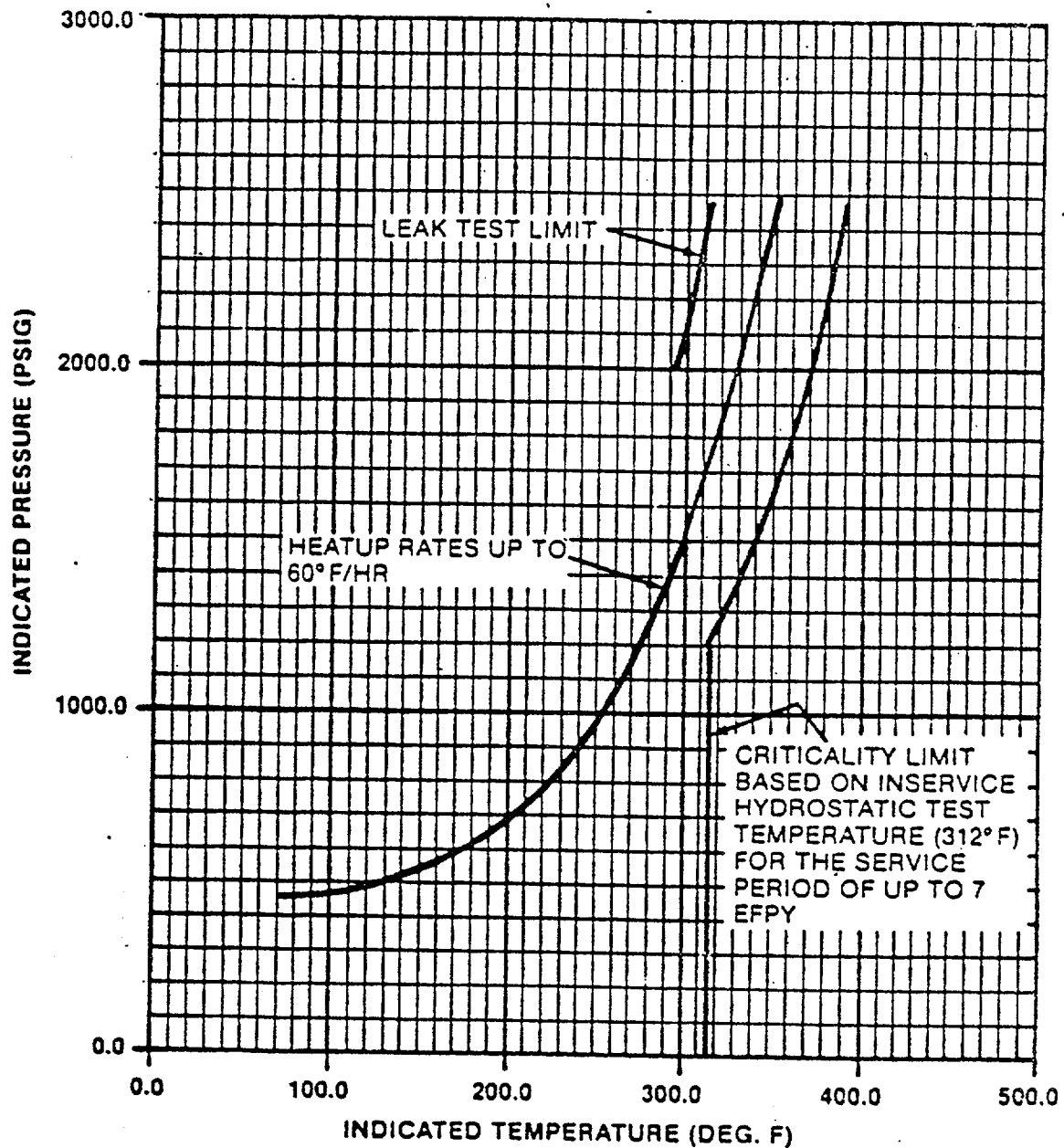
3/4 4-29

B 3/4 4-9

**MATERIAL PROPERTY BASIS:**

CONTROLLING MATERIAL : WELD METAL (UPPER BOUND OF REGULATORY GUIDE  
TREND CURVE)  
RT NDT INITIAL : 0°F  
RT NDT AFTER 7 EFPY : 1/4 T, 167°F  
                              : 3/4 T, 76°F

CURVES APPLICABLE FOR HEATUP RATES UP TO 60°F/HR FOR THE SERVICE PERIOD UP TO 7 EFPY AND CONTAINS MARGINS OF 10°F AND 60 PSIG FOR POSSIBLE INSTRUMENT ERRORS



**Figure 3.4-2 Salem Unit 2 Reactor Coolant System Heatup Limitations  
Applicable Up to 7 EFPY**

**MATERIAL PROPERTY BASIS:**

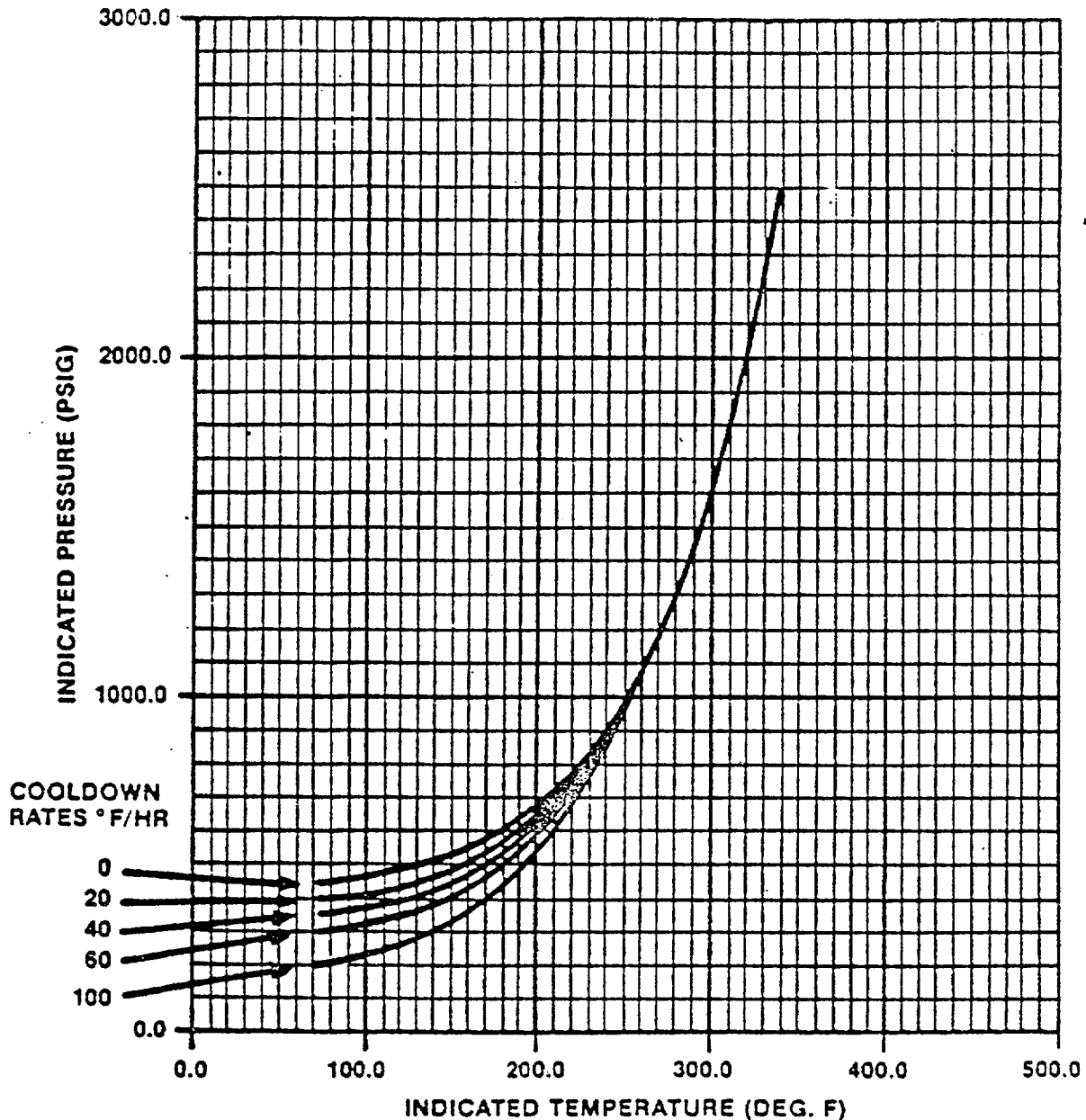
CONTROLLING MATERIAL : WELD METAL (UPPER BOUND OF REGULATORY GUIDE  
TREND CURVE)

RT NDT INITIAL : 0°F

RT NDT AFTER 7 EFPY : 1/4 T, 167°F

: 3/4 T, 76°F

CURVES APPLICABLE FOR COOLDOWN RATES UP TO 100°F/HR FOR THE SERVICE PERIOD  
UP TO 7 EFPY AND CONTAINS MARGINS OF 10°F AND 60 PSIG FOR POSSIBLE INSTRUMENT  
ERRORS



**Figure 3.4-3 Salem Unit 2 Reactor Coolant System Cooldown Limitations  
Applicable Up to 7 EFPY**

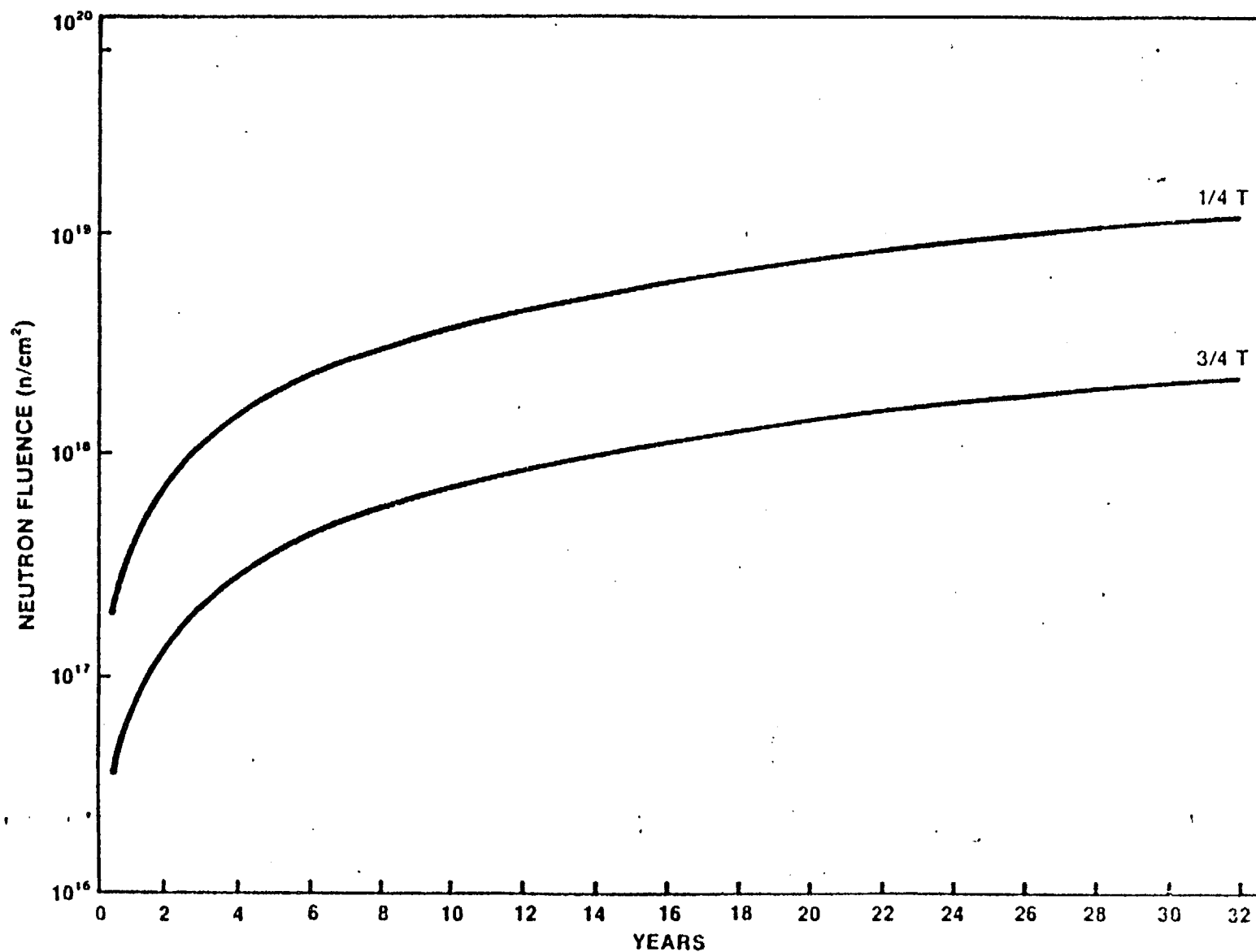


Figure B3/4.4-1 Fast Neutron Fluence ( $E > 1$  MeV) as a Function of Full Power Service Life (EFPY)





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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 47 TO FACILITY OPERATING LICENSE NO. DPR-75

PUBLIC SERVICE ELECTRIC AND GAS COMPANY  
PHILADELPHIA ELECTRIC COMPANY  
DELICATA POWER AND LIGHT COMPANY, AND  
ATLANTIC CITY ELECTRIC COMPANY

SALEM NUCLEAR GENERATION STATION, UNIT NO. 2

DOCKET NO. 50-311

Introduction

In a letter from E. A. Liden to S. A. Varga dated October 15, 1984, the Public Service Electric & Gas Company (the licensee) proposed an amendment to their Facility Operating License DPR-75 for Salem Generating Station, Unit No. 2 (Salem-2). The amendment proposes to revise heatup and cooldown limit curves in Figures 3.4-2 and 3.4-3, and bases Figure B 3/4.4-1 in Appendix A of the Salem-2 Technical Specification. The revised curves are to be applicable through seven (7) effective full power years (EFPY). The bases for these changes are the test results from the Salem-2 surveillance program, which are contained in Report WCAP 10492, "Analysis of Capsule T, Salem Unit 2 Reactor Vessel", dated March 1984. Report WCAP 10492 was submitted for staff review in a letter from E. A. Liden to S. A. Varga dated July 3, 1984.

Evaluation and Summary

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  $RT_{NDT}$  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 Salem-2 reactor vessel was procured to ASME Code requirements, which did not specify fracture toughness testing to determine the initial  $RT_{NDT}$  for each vessel material. The licensee

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indicates that the initial  $RT_{NDT}$  for the limiting materials in the closure flange and beltline regions of the Salem vessel were estimated using the method recommended by the staff in Branch Technical Position MTEB 5-2, "Fracture Toughness Requirements." This method results in an initial  $RT_{NDT}$  for the limiting beltline weld metal of 0°F and an initial  $RT_{NDT}$  for the limiting closure plate material of 26°F.

The increase in  $RT_{NDT}$  resulting from neutron irradiation damage was estimated by the licensee using the empirical relationship documented in Regulatory Guide 1.99, Rev. 1, April 1977, "Effects of Residual Elements on Predicted Radiation Damage to Reactor Vessel Materials." This method of predicting neutron irradiation damage is dependent upon the predicted amount of neutron fluence and the amounts of residual elements (copper and phosphorus) in the beltline material. The neutron fluence predictions were verified by measurements from passive neutron flux monitors and by analysis, which was made with the DOT two-dimensional discrete ordinates code. Inputs into the analysis included 47 neutron energy groups, P3 expansion of the scattering cross section, and power distributions representative of time-averaged conditions derived from statistical studies of long-term operation of Westinghouse 4-loop plants. The cross sections used in the analysis were obtained from the SAILOR cross section library. Using this method of analysis, the measured saturated activity and neutron fluences ( $E > 1\text{MeV}$ ) for five foil reactions, which were calculated from neutron dosimetry in Capsule T, were less than that predicted from the design basis calculated neutron fluences. The authors of WCAP 10492 recommended that projections of vessel toughness into the future be based on the design calculated fluence levels, since the calculated fluence levels were based on conservative representations of core power distributions derived for long-term operation while the Capsule T data are representative only of cycle 1 operation. The staff agrees with this recommendation.

The predicted amounts of neutron irradiation damage are based on design basis calculated neutron fluences and the Regulatory Guide 1.99, Rev. 1 upper limit curves for increase in  $RT_{NDT}$ . The measured increase in  $RT_{NDT}$  from the weld

samples in Capsule T is 155°F. The increase in  $RT_{NDT}$  predicted using Regulatory Guide 1.99, Rev. 1 upper limit curves is 169°F. Since the increase in  $RT_{NDT}$  predicted using the upper limit curves exceeds that measured from the sample material, the upper limit curves should conservatively predict the amounts of neutron irradiation damage.

The staff has used the method of calculating pressure-temperature limits in USNRC Standard Review Plan 5.3.2, NUREG-0800, Rev. 1, July 1981 to evaluate the proposed pressure-temperature limits. The amounts of neutron irradiation damage was calculated using design basis calculated neutron fluences and the Regulatory Guide 1.99, Rev. 1 upper limit prediction curve. Our conclusion is that the proposed pressure-temperature limits meet the safety margins of Appendix G, 10 CFR 50 for 7 EFY and may be incorporated into the plant's technical specifications.

#### 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 Sec 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.

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.

Dated: March 10, 1986

Principal Contributor:

B. Elliot