

October 6, 1999

Mr. J. V. Parrish
Chief Executive Officer
Energy Northwest
P.O. Box 968 (Mail Drop 1023)
Richland, WA 99352-0968

SUBJECT: WNP-2- ISSUANCE OF AMENDMENT RE: PRESSURE TEMPERATURE LIMITS (TAC NO. MA5307)

Dear Mr. Parrish:

The Commission has issued the enclosed Amendment No. 159 to Facility Operating License No. NPF-21 for WNP-2. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated April 20, 1999, as supplemented by letter dated September 9, 1999.

The amendment revises TS 3.4.11, "RCS Pressure and Temperature (PT) Limits."

A copy of the related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,
Original Signed By
Jack Cushing, Project Manager, Section 2
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-397

Enclosures: 1. Amendment No159to NPF-2
2. Safety Evaluation

cc w/encls: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

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Sincerely,

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

Jack Cushing, Project Manager, Section 2
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-397

Enclosures: 1. Amendment No. 159 to NPF-21
2. Safety Evaluation

cc w/encs: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

ENERGY NORTHWEST

DOCKET NO. 50-397

WNP-2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 159
License No. NPF-21

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by the Energy Northwest (licensee) dated April 20, 1999, as supplemented by letter dated September 9, 1999, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's 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. NPF-21 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No.159 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. The license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Stephen Dembek, Chief, Section 2
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: October 6, 1999

ATTACHMENT TO LICENSE AMENDMENT NO. 159

FACILITY OPERATING LICENSE NO. NPF-21

DOCKET NO. 50-397

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change.

REMOVE

3.4-28
3.4-29
3.4-30

INSERT

3.4-28
3.4-29
3.4-30

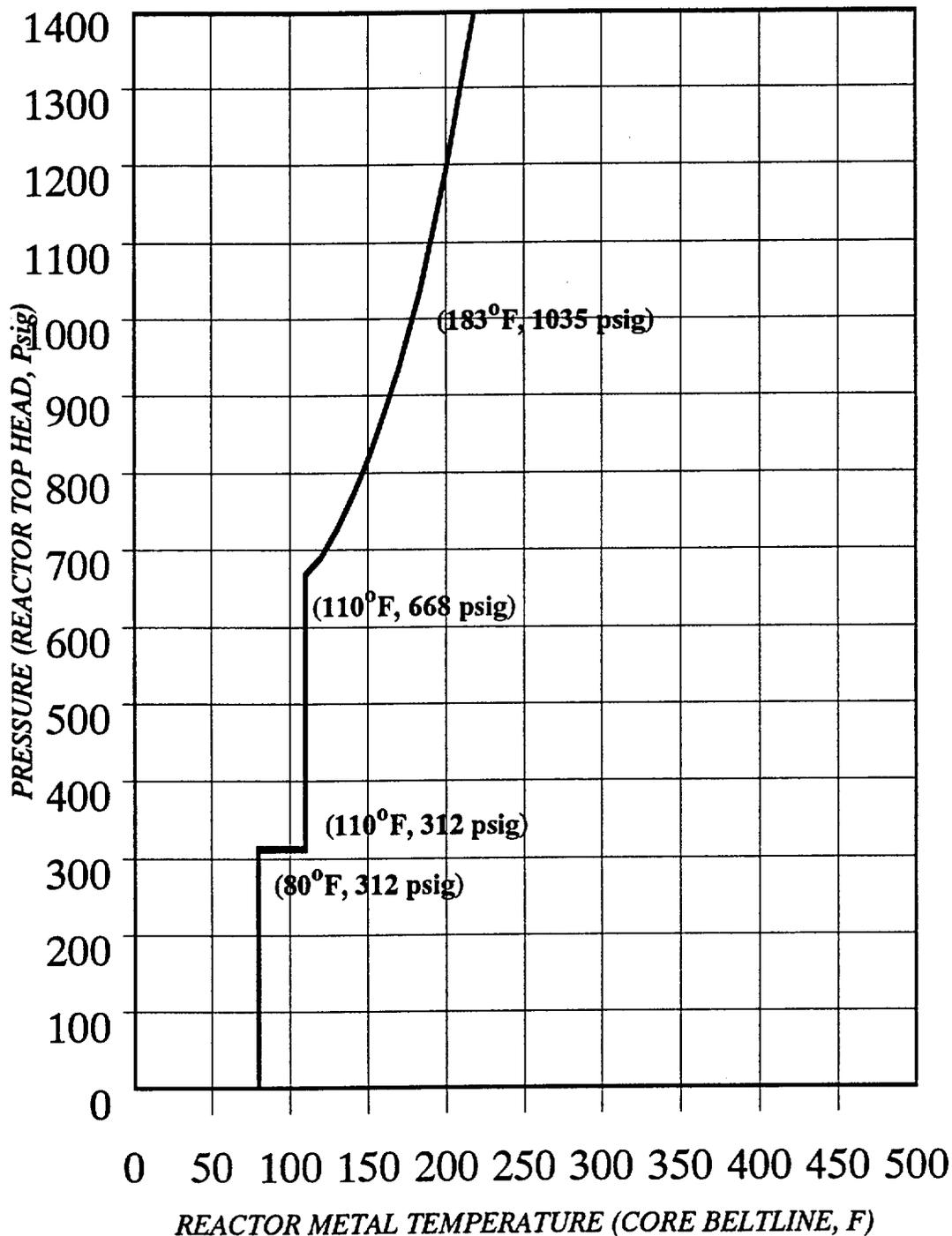


Figure 3.4.11-1 (Page 1 of 1)
Inservice Leak and Hydrostatic Testing Curve

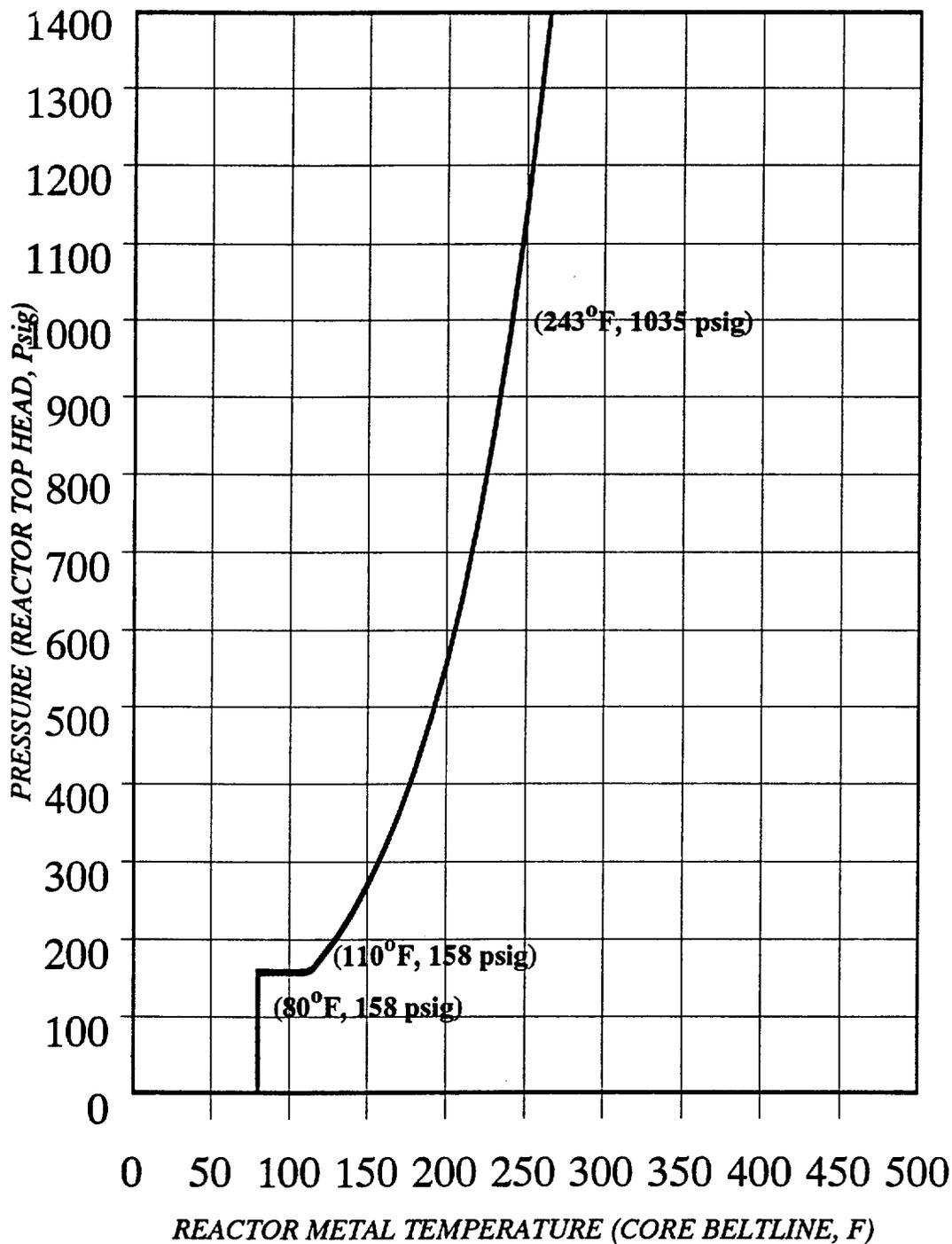


Figure 3.4-11-2 (Page 1 of 1)
Non-Nuclear Heating and Cooldown Curve

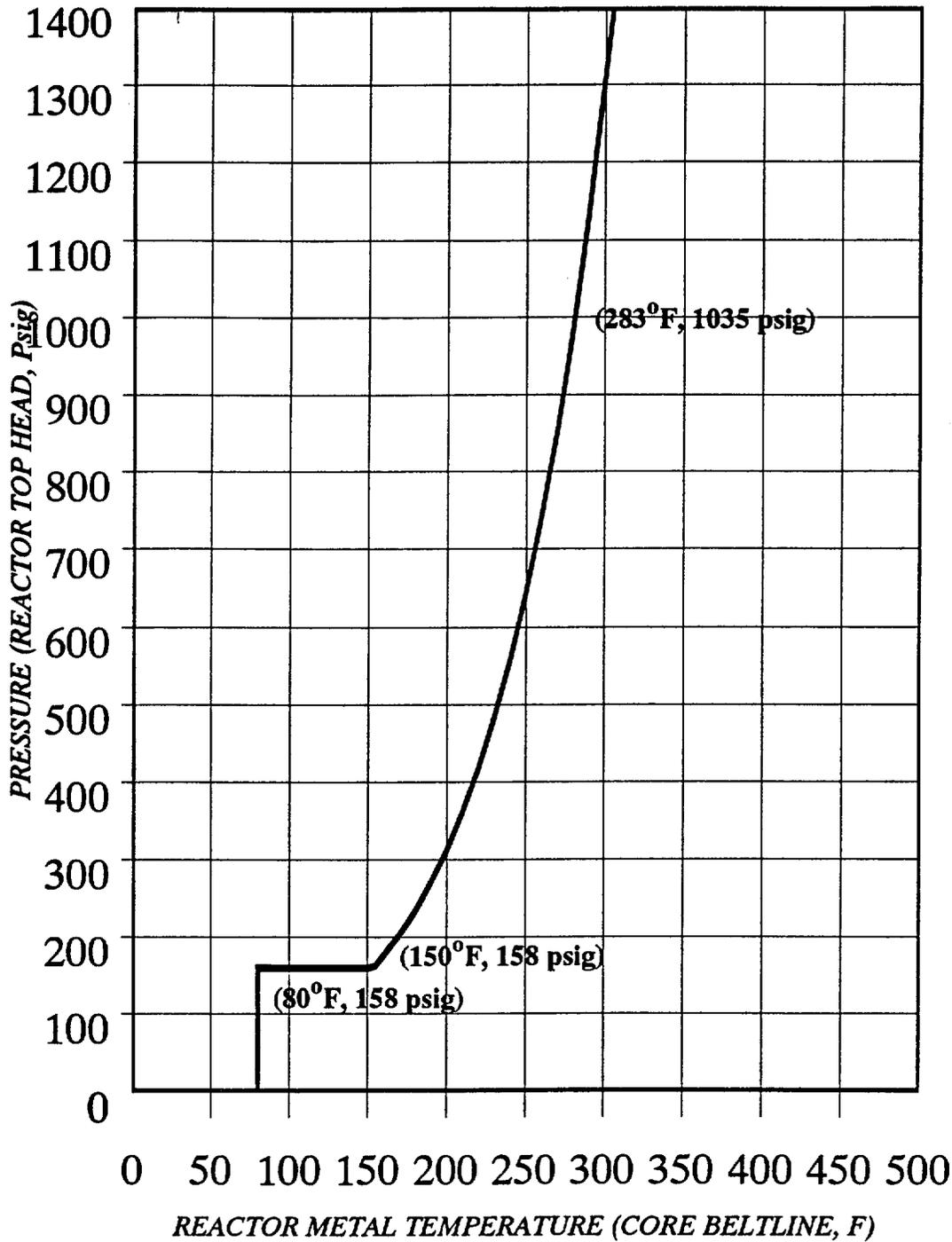


Figure 3.4.11-3 (Page 1 of 1)
Nuclear Heating and Cooldown Curve



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 159 TO FACILITY OPERATING LICENSE NO. NPF-21

ENERGY NORTHWEST

WNP-2

DOCKET NO. 50-397

1.0 INTRODUCTION

By application dated April 20, 1999, as supplemented by letter dated September 9, 1999, Energy Northwest (the licensee, formerly known as Washington Public Power Supply System) requested changes to the Technical Specifications (TSs) (Appendix A to Facility Operating License No. NPF-21) for WNP-2. The proposed changes would revise the WNP-2 pressure and temperature (P-T) limits for 32 effective full power years (EFPY) using the latest vessel beltline material and fluence data.

The supplemental letter dated September 9, 1999, provided clarifying information, did not expand the scope of the application as originally noticed and did not change the staff's original proposed no significant hazards consideration determination published in the FEDERAL REGISTER on May 19, 1999 (64 FR 27330).

The staff evaluated the P-T limits based on the following NRC regulations and guidance: 10 CFR Part 50, Appendix G; Generic Letter (GL) 88-11; GL 92-01, Revision 1 (Rev. 1); GL92-01, Rev. 1, Supplement 1; Regulatory Guide (RG) 1.99, Revision 2 (Rev. 2); and Standard Review Plan (SRP), Section 5.3.2. GL 88-11 advised licensees that the staff would use RG 1.99, Rev. 2, to review P-T limit curves. RG 1.99, Rev. 2, contains methodologies for determining the increase in transition temperature and the decrease in upper-shelf energy (USE) resulting from neutron radiation. GL 92-01, Rev. 1, requested that licensees submit their reactor pressure vessel (RPV) data for their plants to the staff for review. GL 92-01, Rev. 1, Supplement 1, requested that licensees provide and assess data from other licensees that could affect their RPV integrity evaluations. These data are used by the staff as the basis for the staff's review of P-T limit submittals, and as the basis for the staff's review of pressurized thermal shock assessments (10 CFR 50.61 assessments). Appendix G to 10 CFR Part 50 requires that P-T limits for the RPV be at least as conservative as those obtained by applying the methodology of Appendix G to Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel (ASME) Code. Section 50.55a specifies the addenda and edition of the ASME Code that is to be utilized by licensees in determining P-T limits.

Section 5.3.2 of the SRP provides an acceptable method of calculating the P-T limits for ferritic materials in the beltline of the RPV based on the linear elastic fracture mechanics methodology

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of Appendix G to the 1989 Edition of Section XI of the ASME Code. The basic parameter of this methodology is the stress intensity factor K_I , which is a function of the stress state and flaw configuration. The methods of Appendix G postulate the existence of a sharp surface flaw in the RPV that is normal to the direction of the maximum stress. This flaw is postulated to have a depth that is equal to one-fourth of the RPV beltline thickness and a length equal to 1.5 times the RPV beltline thickness. The critical locations in the RPV beltline region for calculating heatup and cooldown P-T limit curves are the 1/4-inch thickness (1/4T) and 3/4-inch thickness (3/4T) locations, which correspond to the depth of the maximum postulated flaw from the inside and outside surfaces of the RPV, respectively.

Appendix G of 10 CFR Part 50 requires that licensees determine the adjusted reference temperature (ART or RT_{NDT}) and the Charpy USE at the maximum postulated flaw depth. The ART is defined as the sum of the initial (unirradiated) reference temperature (initial RT_{NDT}), the mean value of the adjustment in reference temperature caused by irradiation (ΔRT_{NDT}), and a margin term. The ΔRT_{NDT} is a product of a chemistry factor and a fluence factor. The chemistry factor is dependent upon the amount of copper and nickel in the material and may be determined from tables in RG 1.99, Rev. 2, or from surveillance data. The fluence factor is dependent upon the neutron fluence at the maximum postulated flaw depth. The margin term is dependent upon whether the initial RT_{NDT} is a plant-specific or a generic value and whether the chemistry factor was determined using the tables in RG 1.99, Rev. 2, or surveillance data. The margin term is used to account for uncertainties in the values of initial RT_{NDT} , copper and nickel contents, fluence, and calculational procedures. RG 1.99, Rev. 2, describes the methodology to be used in calculating the margin term.

2.0 EVALUATION

2.1 ART Values for the Limiting Beltline Material

The staff evaluated the effect of neutron irradiation embrittlement on each beltline material in the reactor vessel of WNP-2. The amount of irradiation embrittlement was calculated in accordance with RG 1.99, Rev. 2. The staff has determined that the material with the highest ART at 32 EFPY is the No. 1 Ring C1272-1, with 0.15 percent copper, 0.60 percent nickel, and an initial RT_{NDT} of 28°F. The ART calculated by the staff is 80.0°F at 1/4T and 53.3°F at 3/4T for the limiting material. The ARTs at 1/4T and 3/4T were calculated based on 80 percent of the peak RPV inside-diameter fluence at 32 EFPY of $7.57E17$ n/cm². The staff accepted this reduced fluence because only 14 inches of the ring extends into the active fuel area from its bottom whereas peak fluence is found at 100 inches above the bottom of active fuel. The ART calculated by the licensee, using the Chemistry Factor Table in Section 1.1 of RG 1.99, Rev. 2, is 79.2°F at 1/4T and 53.1°F at 3/4T. Both the staff and the licensee included the cladding thickness of 0.125 inch in calculating the attenuation of the fluence through the vessel wall. After a comparison, the staff concludes that the ARTs calculated by the staff and the licensee are almost identical.

2.2 P-T Limits

Substituting the ART of 79.2°F at 1/4T for the cooldown and 53.1°F at 3/4T for the heatup into equations in SRP Section 5.3.2, the staff could not verify the proposed P-T limit curves. In its response dated September 9, 1999, to the staff's request for additional information, the

licensee provided its detailed P-T limits methodology. This information revealed that for the nuclear heatup and cooldown curve, the licensee has added 40.0°F over the ASME Appendix G limits. In addition, the licensee has added 30.0°F to account for the difference between the fluid temperature and the 1/4T metal temperature. The staff determined that it is not necessary to consider this 30.0°F in the proposed P-T limits because the temperature axis of the licensee's proposed P-T limits is the 1/4T metal temperature of the RPV wall (confirmed in the licensee's supplement dated September 9, 1999), which is the same as the temperature used in the fracture toughness (K_{Ia}) equation in the ASME Appendix G methodology. After consideration of the additional conservatism of 30.0°F in the licensee's proposed P-T limits (for 32 EFPY), the staff agrees with the proposed P-T limits for heatup, cooldown, and hydrotest, and concludes that the proposed P-T limits meet the beltline material requirements in Appendix G of 10 CFR Part 50.

In addition to beltline materials, Appendix G of 10 CFR Part 50 imposes P-T limits based on the reference temperature for the reactor vessel closure flange materials. Section IV.A.2 of Appendix G states that when the pressure exceeds 20 percent of the preservice system hydrostatic test pressure, the temperature of the closure flange regions highly stressed by the bolt preload must exceed the reference temperature of the material in those regions by at least 120°F for normal operation and by 90°F for hydrostatic pressure tests and leak tests. Based on the flange limiting material reference temperatures of 20°F, the minimum allowable temperature of this region is 110°F (20°F+90°F) as indicated by the straight line of 110°F of the hydrostatic testing curve. The 80°F line appearing in the P-T limits for all conditions is in accordance with item 2e of Table 1 of Appendix G of 10 CFR Part 50, which requires a minimum temperature of 60°F be added to the flange limiting material reference temperature of 20°F. Hence, the staff has determined that the proposed P-T limits satisfy the requirements in Section IV.A.2 of Appendix G of 10 CFR Part 50.

Appendix G further requires that the predicted Charpy USE at end-of-license (EOL) for vessel beltline materials be above 50 ft-lb or that licensees demonstrate that lower values of Charpy USE will provide margins of safety equivalent to those required by Appendix G of Section XI of the ASME Code. This USE requirement is satisfied because all beltline materials have EOL USEs above 50 ft-lb.

The staff concludes that the proposed P-T limits for the reactor coolant system for heatup, cooldown, leak test, and criticality are valid as indicated on the curves. The P-T limits satisfy the requirements of Appendix G of 10 CFR Part 50 for 32 EFPY. The proposed P-T limits also satisfy GL 88-11 because the method in RG 1.99, Rev. 2, was used to calculate the ART. Hence, the proposed P-T limits may be incorporated into the WNP-2 TSs.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Washington State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC 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 the amendment involves no significant hazards consideration, and there has been no public comment on such finding (64 FR 27330). 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.

5.0 CONCLUSION

The Commission has 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, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: S. Sheng

Date: October 6, 1999