



Nebraska Public Power District

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NSD930928
December 10, 1993

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Gentlemen:

Subject: Proposed Change No. 119 to Technical Specifications
Revision of Pressure - Temperature Limitation Curves
Cooper Nuclear Station, NRC Docket No. 50-298, DPR-46

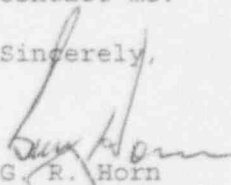
In accordance with the applicable provisions specified in 10 CFR 50, the Nebraska Public Power District (District) requests that the Cooper Nuclear Station (CNS) Technical Specifications be revised as specified in the attachment. The proposed changes revise the pressure vs. temperature operating limit curves for CNS based on the results of the testing and analysis performed as part of the District's reactor vessel material surveillance program required by 10 CFR 50 Appendix H.

Accordingly, the attached contains a description of the proposed change, the attendant 10 CFR 50.92 evaluation, and the CNS Technical Specification pages revised by the institution of this change. This proposed change has been reviewed by the necessary Safety Review Committees and incorporates all amendments to the CNS Facility Operating License through Amendment 165 issued July 16, 1993.

By copy of this letter and attachment, the appropriate State of Nebraska official is being notified in accordance with 10 CFR 50.91(b)(1). Copies to the NRC Region IV Office and the CNS Resident Inspector are also being sent in accordance with 10 CFR 50.4(b)(2).

Should you have any questions or require any additional information, please contact me.

Sincerely,



G. R. Horn
Vice President - Nuclear

GRH/MJB

200037

Attachment

cc: H.R. Borchert
Department of Health
State of Nebraska

NRC Regional Administrator
Region IV
Arlington, TX

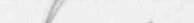
NRC Resident Inspector 9312210313 931210
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Powerful Pride in Nebraska

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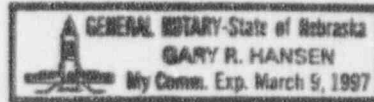
STATE OF NEBRASKA)
NEMAHIA COUNTY)

statements contained herein are true



G. R. Horn

Darryl R. Hansen
NOTARY PUBLIC



PROPOSED CHANGE NO. 119
TO THE
CNS TECHNICAL SPECIFICATIONS
REVISION OF PRESSURE VS. TEMPERATURE
OPERATION LIMITATION CURVES

Revised Pages

132
147
154
155
156

I. INTRODUCTION

The Nebraska Public Power District (District) requests that the NRC approve the proposed changes to the Cooper Nuclear Station (CNS) Technical Specifications described below. The proposed changes revise the existing pressure-temperature operating limit curves (PT Curves) based on the results of the recent testing and analysis performed on CNS reactor vessel material specimens removed from the CNS vessel during the Reload 14, Cycle 15 Refueling outage.

Section 3.6.A of the CNS Technical Specifications, "Thermal and Pressurization Limits," defines, through Figure Nos. 3.6.1.a, 3.6.1.b, and 3.6.2, the pressure and temperature boundaries within which CNS must be operated to ensure adequate margin exists to prevent reactor vessel brittle fracture. These PT Curves are generated, in part, based on the predictions of the change in Adjusted Reference Temperature (ART) of the reactor vessel limiting materials as the reactor vessel neutron exposure increases with operating life. The ART is the initial nil-ductility transition temperature, RT_{NDT} , plus the expected shift in RT_{NDT} due to the estimated neutron fluence received.

The current PT Curves are based on ARTs calculated in accordance with Regulatory Position 1.1 of Regulatory Guide 1.99, Revision 2, which provides a means of estimating reference temperature shift with less than two sets of plant specific surveillance data available. The proposed PT Curves are based on ARTs calculated based on the guidance in Regulatory Position 2.1 of Regulatory Guide 1.99, Revision 2, which adjusts the ARTs to account for the results of plant-specific surveillance data, where two or more sets of surveillance data are available.

The testing and analysis of the second set of CNS reactor vessel material surveillance specimens was recently completed. The results of that testing and analyses is documented in GE Nuclear Energy Report No. GE-NE-523-159-1292^{1/} which was transmitted to the NRC by letter dated February 25, 1993.^{2/} The proposed PT Curves reflect the results of that surveillance testing and analysis.

The following discussion describes the specific changes proposed, and the bases for those proposed changes. Appendix A provides a mark-up of the proposed Technical Specifications changes (with the exception of the PT Curves), and Appendix B provides the revised Technical Specifications pages, including the revised PT Curves.

II. DISCUSSION

Regulatory Guide 1.99, Revision 2 provides a method acceptable to the NRC for predicting the effect of neutron radiation on reactor vessel materials as required by Paragraph V.A of 10 CFR 50 Appendix G. Because of the scatter inherent to Charpy test data, Regulatory Guide 1.99, Revision 2 requires at least two sets of surveillance data be available before using the reactor-specific data to determine ART and the Charpy upper-shelf energy of reactor beltline materials. As a result of testing and analysis performed on the second set of CNS reactor vessel material specimens, the District now has two sets of reactor vessel material surveillance data for CNS. Therefore, the District proposes to revise the CNS PT Curves to account for the results of its reactor vessel surveillance testing program which have been applied in accordance with NRC Regulatory Guide 1.99, Revision 2.

In accordance with the guidance of Regulatory Guide 1.99, Revision 2, Regulatory Position 2.1, the District adjusted the ART predictions based on a surveillance adjustment factor calculated in accordance with that guidance. The result is a conservative estimate of ART for predicted reactor vessel fluence levels.

The CNS Technical Specifications contain three PT Curves for operator use based on the corresponding application. Figure 3.6 1.a provides the minimum vessel temperature vs. vessel pressure for non-nuclear heatup and for core cooldown following nuclear shutdown, and is valid through 32 EFPY. Figure 3.6.1.b provides the minimum vessel temperature vs. vessel pressure for core operation (when the core is critical), and is also valid through 32 EFPY. Figure 3.6.2 provides the minimum vessel temperature vs.

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1. GE Nuclear Energy Report No. GE-NE-523-159-1292, dated February, 1993, "Cooper Nuclear Station Vessel Surveillance Materials Testing and Fracture Toughness Analysis."
 2. Letter from G. R. Horn to NRC dated February 25, 1993, "Submittal of Reactor Vessel Surveillance Test Results."

vessel pressure for pressure tests such as that required by Section XI of the ASME code. This figure provides five curves based on 15, 18, 21, 24, and 32 EFPY. Five curves were generated for Figure 3.6.2 to provide greater operational flexibility while performing system pressure tests, depending upon vessel exposure. Each of these curves are based on a calculated ART for the limiting vessel material for a given reactor vessel fluence level, given in EFPY.

Based on the new analysis, performed in accordance with the guidance of Regulatory Guide 1.99, Revision 2, the District has revised Figures 3.6.1.a, 3.6.1.b, and 3.6.2, and the corresponding Bases discussion. The specific changes are described below in Section III, "Description of Changes."

III. DESCRIPTION OF CHANGES

- Page 132 - Section 3.6.A.2 is revised to clarify that this specification does not apply to inservice hydrostatic or pressure vessel leak testing. Section 3.6.A.2 is also rearranged to provide a more logical order of discussion. Additionally, section 3.6.A.3 is revised to change the Figure 3.6.2 curve references from 13, 18, & 21 EFPY to 15, 18, 21, 24 or 32 EFPY. In addition, "botton" is corrected to read "bottom."
- Page 147 - The 3/4.6 Bases section is revised to describe the basis for the revised PT Curves.
- Page 154 - Figure 3.6.1.a, "Minimum Temperature for Non-Nuclear Heatup or Core Cooldown Following Nuclear Shutdown," is revised to reflect the new pressure vs. temperature requirements for this operational mode. In addition, this figure's period of validity is revised from 21 to 32 EFPY, and the figure title is truncated to "Minimum Temperature for Non-Nuclear Heatup/Cooldown."
- Page 155 - Figure 3.6.1.b, "Minimum Temperature for Core Operation (Criticality) - Includes 40°F Marg'n Required by 10CFR50 Appendix G," is revised to reflect the new pressure vs. temperature requirements for this operational mode, and the period of validity is revised from 21 to 32 EFPY. Additionally, the title for Figure 3.6.1.b is truncated to read "Minimum Temperature for Core Critical Operation."
- Page 156 - Figure 3.6.2, "Minimum Temperature for Pressure Tests Such as Required by Section XI," is revised to reflect the new pressure vs. temperature requirements for this operational mode, and the period of validity is changed from 13, 18, & 21 EFPY to 15, 18, 21, 24, and 32 EFPY. The title for Figure 3.6.2 is truncated to read "Minimum Temperature for Pressure Tests."

IV. SIGNIFICANT HAZARDS DETERMINATION

10 CFR 50.91(a)(1) requires that licensee requests for operating license amendments be accompanied by an evaluation of significant hazards posed by the issuance of the amendment. This evaluation is to be performed with respect to the criteria given in 10 CFR 50.92(c). The following analysis meets these requirements.

Evaluation of this Amendment with Respect to 10 CFR 50.92

The enclosed Technical Specifications change is judged to involve no significant hazards based on the following:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Evaluation

The proposed revisions to the existing Cooper Nuclear Station (CNS) Technical Specifications pressure vs. temperature operating limit curves (PT Curves) do not involve a significant increase in the probability or consequences of an accident previously evaluated. The existing PT Curves, approved with Amendment No. 155 to the CNS operating license, were developed based on Regulatory Guide 1.99, Revision 2, Regulatory Position 1.1, which provides a method acceptable to the NRC for predicting Adjusted Reference Temperatures (ARTs) with less than two sets of surveillance data available. When the existing PT Curves were submitted and approved, only one set of reactor vessel surveillance data was available for CNS.

Since that time, the District has withdrawn, tested, and analyzed reactor vessel material samples to obtain a second set of surveillance data. Accordingly, the proposed PT Curves are based on ARTs for the limiting CNS reactor vessel materials which are derived from the results of the testing and analysis performed for the two sets of surveillance specimens withdrawn to date. The predicted ARTs from which the proposed PT Curves are based have been calculated in accordance with the methodology described in Regulatory Position 2.1 of Regulatory Guide 1.99, Revision 2, which describes a means acceptable to the NRC for predicting ART shift when two or more sets of surveillance data are available. The results of the testing and analysis of the second set of surveillance data, and the development of the proposed PT Curves are detailed in GE Nuclear Energy Report No. GE-NE-523-159-1292,^{3/}

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3. GE Nuclear Energy Report No. GE-NE-523-159-1292, dated February, 1993, "Cooper Nuclear Station Vessel Surveillance Materials Testing and Fracture Toughness Analysis."

which was transmitted to the NRC by letter dated February 25, 1993.^{4/}

This testing and analysis resulted in predicted ARTs for the limiting CNS reactor vessel beltline materials as shown in the following table.

EFFECTIVE FULL POWER YEARS (EFPY)	ADJUSTED REFERENCE TEMPERATURE (°F)
15	89
18	96
21	101
24	108
32	128

Based on the new ART predictions for the CNS limiting reactor vessel materials, new PT Curves have been generated. These include Figure 3.6.1.a, "Minimum Temperature for Non-Nuclear Heatup/Cooldown," Figure 3.6.1.b, "Minimum Temperature for Core Critical Operation," and Figure 3.6.2, "Minimum Temperature for Pressure Tests." Additionally, five separate curves are plotted in Figure 3.6.2 to provide operational flexibility when performing pressure tests, based on reactor vessel fluence level. These curves are based on fluence levels predicted for 15, 18, 21, 24, and 32 EF PY, with corresponding ARTs as shown in the above table.

The proposed revision to the CNS PT Curves is based on an NRC-accepted means of ensuring protection against brittle reactor vessel failure, and compliance with 10 CFR Appendix G will be maintained. Therefore, this proposed change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility for a new or different kind of accident from any accident previously evaluated?

Evaluation

The proposed changes update the CNS reactor vessel pressure vs. temperature operating limits to account for the results of the

4. Letter from G. R. Horn to NRC dated February 25, 1993, "Submittal of Reactor Vessel Surveillance Test Results."

testing and analysis of the second set of CNS reactor vessel surveillance specimens. This analysis was performed in accordance with Regulatory Guide 1.99, Revision 2, and therefore, corresponds with the current NRC guidance.

The proposed changes do not involve any plant design changes nor any new mode of operation. These changes ensure compliance with the brittle fracture prevention requirements of 10 CFR 50 Appendix G, and therefore do not create the possibility for a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change create a significant reduction in the margin of safety?

Evaluation

The proposed changes to the CNS PT Curves do not create a significant reduction in the margin of safety. The proposed changes revise the existing CNS PT Curves in accordance with the results of the testing and analysis of the second set of reactor vessel surveillance specimens. This analysis has been performed in accordance with the recommendations of Regulatory Guide 1.99, Revision 2, the current NRC guidance given to ensure compliance with 10 CFR Appendix G.

The proposed revisions to the CNS PT Curves represent a slight reduction in predicted ARTs from that assumed in the existing PT Curves, and therefore, a slight reduction in temperature requirements for the PT Curves plotted in Figure 3.6.2, "Minimum Temperature for Pressure Tests." This reduction is due to improvements in the reactor vessel neutron flux distribution modeling which demonstrated an axial variance, and resulted in a reduction in the predicted fluence for the limiting reactor vessel beltline plate. However, the amount of shift predicted, based on the reactor vessel surveillance material adjustment determined in accordance with the guidance of Regulatory Guide 1.99, Revision 2, is greater than that predicted using Regulatory Guide 1.99, Revision 2 methods without surveillance adjustment. Therefore, while the net change to the ARTs and accordingly, the PT Curves in Figure 3.6.2 has been a reduction in temperature requirements, adequate margin is added to these predictions as described in Regulatory Position 2.1 of Regulatory Guide 1.99, Revision 2. Therefore, implementation of the proposed PT Curves in Figure 3.6.2 will not represent a significant reduction in the margin of safety.

The minimum reactor vessel temperature requirements for non-nuclear heatup/cooldown and core critical operation given in Figures 3.6.1.a and 3.6.1.b, respectively, are actually higher than the existing PT Curves, as these two figures were developed to be valid through 32 EFPY. Additionally, as stated above, these curves were developed based on the same ART predictions discussed previously, and

accordingly, are in accordance with the current NRC guidance. Therefore, implementation of these PT Curves will not represent a significant reduction in the margin of safety.

Details of the testing and analysis discussed above is provided in GE Report No. GE-NE-523-159-1292^{3/} submitted to the NRC by letter dated February 25, 1993.^{4/}

V. CONCLUSION

The District has evaluated the proposed changes described above against the criteria given in 10 CFR 50.92(c) in accordance with the requirements of 10 CFR 50.91(a)(1). This evaluation has determined that this proposed change will not 1) involve a significant increase in the probability or consequences of an accident previously evaluated, 2) create the possibility for a new or different kind of accident from any accident previously evaluated, or 3) create a significant reduction in the margin of safety. Therefore, for the reasons detailed above, the District requests NRC approval of Proposed Change No. 119.

APPENDIX A