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SUBJECT: Application for Amend 71 to License DPR-43, revising Tech Specs re heatup & cooldown limit curves. Fee paid.

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April 29, 1986

Dr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Proposed Amendment No. 71, Revised Heatup and Cooldown Limit Curves

Enclosed please find three (3) signed and notarized original transmittal letters and forty (40) copies of Proposed Amendment No. 71 to the Kewaunee Nuclear Power Plant (KNPP) Technical Specifications. This proposed amendment is being submitted to revise the current heatup and cooldown limit curves for the KNPP.

The KNPP Technical Specifications require that reactor coolant temperature, pressure, and system heatup and cooldown rates be limited in accordance with the heatup and cooldown curves. The current curves were determined in 1981 to be applicable until 10 effective full power years (EFPY). This determination was based on Regulatory Guide 1.99, Revision 1 and the information available at that time concerning the limiting circumferential weld. Since that time, much has transpired in the areas of reactor vessel weld chemistry and radiation effects on reactor vessel materials. Most recently, 10 CFR 50.61, "Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events," became effective. As part of the response required by this rule, WPSC determined a best-estimate material content for the limiting reactor vessel weld. This revised material composition consists of a higher copper and nickel content than previously assumed for the limiting weld. Therefore, the basis for the new material content is provided in Attachment A.

Based on the higher copper and nickel content assumed for the limiting weld, WPSC reevaluated the expiration date of the current curves. This reevaluation indicated that the current curves would be conservatively predicted to expire at 9.5 EFPY instead of 10 EFPY. Currently, the KNPP is expected to reach 9.5 EFPY approximately 30 effective full power days after returning to operation

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following the 1986 refueling outage. It is predicted that this date would occur sometime in late May of 1986. In response to the unanticipated early expiration date of the heatup and cooldown curves, WPSC requests that the NRC review of this proposed amendment be performed as expeditiously as resources allow. In any event, beginning May 20, 1986, WPSC will administratively limit the operation of the KNPP with the more restrictive curves proposed by this amendment. These administrative controls will remain in effect until superseded by an approved Technical Specification amendment. These controls are technically adequate as the proposed curves were prepared based on the improved revision 2 of Regulatory Guide 1.99. Conservatism is ensured as the proposed curves are effective to 15 EFPY and the KNPP will not reach even 11 EFPY until approximately February, 1988. The date for 15 EFPY is predicted for sometime in late 1992. Therefore, the curves are conservative for short-term use until the proposed amendment is approved.

In addition to the heatup and cooldown curves, the administrative controls will also include revision of the appropriate Emergency Operating Procedures. Also, it should be noted that WPSC is currently evaluating the Low Temperature/Overpressure protection (LTOP) used for the KNPP based on the heatup and cooldown limit curves proposed by this amendment. Technical specifications will be forthcoming on the LTOP system.

The heatup and cooldown curves proposed by this amendment are valid to 15 EFPY and are based on the revised material content and on the Draft Regulatory Guide 1.99, Revision 2 which was issued for comment on February 10, 1986. When compared to the current curves, all the limit lines on the proposed curves, including the in-service leak test and criticality limits, have shifted to the right. The documentation for the preparation of the proposed curves is set forth in Attachment B. However, the cooldown curve proposed by this amendment does differ in one way from the curve shown in Attachment B. WPSC has determined that for this specific curve it is not necessary to take credit for cooldown rates less than 20°F/hour. Therefore, the 0°F/hour curve has been deleted and all cooldown rates less than 20°F/hour will be limited by the more restrictive 20°F/hour cooldown curve.

The following Technical Specification pages are affected by Proposed Amendment No. 71:

TS 3.1-3 through TS 3.1-11a
Figures TS 3.1-1 through TS 3.1-4

A description of the specific changes, along with the appropriate safety evaluations and significant hazards determinations, are included in Attachment C to this letter. Attachment D provides the affected pages of Proposed Amendment No. 71.

As required by 10 CFR 50.91(b)(i), a copy of this application and significant hazards determination is being sent to the Public Service Commission of Wisconsin; in accordance with the provisions of 10 CFR 170, a check for $150 is enclosed.

Sincerely,

Carl W. Giesler

Carl W. Giesler
Vice President - Power Production

KAH/jms

Enc.

cc - Mr. G. E. Lear, US NRC
Mr. Robert Nelson, US NRC
Mr. R. S. Cullen, PSCW

Subscribed and Sworn to
Before Me This 29th Day
of April 1986

Jeanne M. Stein
Notary Public, State of Wisconsin

My Commission Expires:
June 28, 1987

Proposed Amendment No. 71

Attachment A

To

Letter from C. W. Giesler (WPSC) to H. R. Denton (NRC)

Dated

April 29, 1986

Material Information for Limiting Reactor Vessel Weld

REFERENCES

1) Letter from D. C. Hintz (WPSC) to G. E. Lear (NRC) dated January 23, 1986.

2) SECY-82-465, "Pressurized Thermal Shock (PTS)," November 23, 1982.

3) Letter from R. L. Kelly (W) to C. W. Giesler (WPSC) dated January 16, 1978 (Letter number WPS-78-502)

Introduction

The proposed heatup and cooldown limit curves were prepared based on Draft Regulatory Guide 1.99, Revision 2. This document provides guidance on calculating the effects of radiation on reactor vessel materials. However, certain information must be known about the vessel materials for the calculations to be performed. The required information is the initial reference temperature (including standard deviation where a generic mean is used) and the nickel and copper content of the material. Much of this information was provided to the NRC by reference 1 in response to 10 CFR 50.61. However, the information will be presented here to allow comparison with the guidance of Draft Regulatory Guide 1.99, Revision 2. It should be noted the limiting reactor vessel material is the beltline circumferential weld. The KNPP reactor vessel was manufactured without beltline longitudinal welds.

Initial Reference Temperature

Revision 2 of the regulatory guide allows the use of generic mean values in cases where measured values are not available as long as sufficient test results exist to establish a mean and standard deviation for the class of material. As described in reference 1, the KNPP reactor vessel beltline circumferential weld was completed at a time when the ASME code did not require the tests necessary to allow calculation of an initial reference temperature. However, as described by Appendix E of SECY-82-465 (reference 2), a generic data base does exist for the weld flux Linde 1092. This weld flux was verified as the KNPP vessel beltline weld flux by reference 3. The generic mean for initial reference temperature for Linde 1092 is -56°F with a standard deviation of 17°F. Therefore, for Draft Regulatory Guide 1.99, Revision 2, Initial RT_{NDT} is -56°F and σ_I is 17°F.

Copper and Nickel Content

Revision 2 of the regulatory guide allows the use of best-estimate values of material content. The manner in which WPSC determined the best-estimate value is described below and in reference 1.

The reactor vessel beltline circumferential weld was made by approximately seven coils of weld wire, heat number 1P3571. Each of these coils consisted of a bare weld wire covered with a copper coating that varied from coil to coil. This copper had been added by the weld wire manufacturer primarily for three reasons:

1) prevent corrosion and, therefore, prolong the shelf life of the weld wire,

2) provide lubrication during the weld wire drawing process, and

3) increase the weld wire electrical conductivity.

The amount of copper coating varied from coil to coil because there were no requirements on weld wire copper content at that time. Therefore, the weld wire manufacturer did not emphasize the control of the amount of copper coating added to the weld wire. However, the specific weld wire manufacturer that made the KNPP reactor vessel beltline weld wire would copper coat all weld wires in the same manner, independent of the weld wire heat number. Since the process was independent of the heat number, WPSC could establish a data base consisting of the amount of copper added by the same manufacturer using the same process over a relatively short time frame. Working closely with the vessel manufacturer for KNPP, WPSC established twenty data points applicable to our weld wire manufacturer for the time frame consistent with our vessel fabrication date. Each of these data points consisted of an initial bare wire copper content and a final weld copper content. From this data base, WPSC established a mean value of 0.16 w/o copper added by the copper coating process.

To use this data in a plant-specific manner, WPSC established an initial copper content for the weld wire heat number used in the beltline weld. From information supplied by our vessel manufacturer, the initial bare wire copper content of 1P3571 is 0.08 w/o copper. Combining the average amount of copper added by the copper coating process with the initial copper content gives a best-estimate value of 0.24 w/o copper that applies to the weld wire used in the beltline weld.

The best-estimate nickel content was established by a simpler process as nickel content did not vary due to the copper coating process. Therefore, WPSC was able to calculate the mean of the nickel content of weld samples of 1P3571 and establish 0.78 w/o nickel as the best-estimate nickel content for the beltline weld.

Summary

The material information used to prepare the proposed heatup and cooldown limit curves is given in the following table.

Table A-1

Material Information for Beltline Circumferential Weld

Initial Reference Temperature	-56°F
Standard Deviation of Initial Reference Temperature	17°F
Copper Content	0.24 w/o
Nickel Content	0.78 w/o

Proposed Amendment No. 71

Attachment B

To

Letter from C. W. Giesler (WPSC) to H. R. Denton (NRC)

Dated

April 29, 1986

Pressure/Temperature Operating Curves

SWRI Report 06-8919