



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D. C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

TENDON SURVEILLANCE REPORT

FACILITY OPERATING LICENSE NOS. DPR-24 AND DPR-27

WISCONSIN ELECTRIC POWER COMPANY

POINT BEACH NUCLEAR PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-266 AND 50-301

1. INTRODUCTION

The NRC staff performed a structural audit at the Point Beach Nuclear Plant, Units 1 and 2, on October 21 through 24, 1991. During the audit the staff noticed that Wisconsin Electric Power Company had used different tolerance bands (upper and lower limits) of the acceptable tendon prestressing force in 1985 and 1989. As a result of this discovery, the NRC staff requested that copies of the last three tendon surveillance reports of the two units be submitted for review. The licensee submitted all tendon surveillance reports (1971, 1974, 1979, 1984, and 1989) on December 23, 1991. After reviewing the reports, the staff found that the licensee had used "normalizing factors" in the calculations of tolerance bands of the acceptable tendon prestressing forces and of actual tendon prestressing forces. The use of the normalizing factors by the licensee is not consistent with the recommendations of Regulatory Guide 1.35.1, "Determining Prestressing Forces for Inspection of Prestressed Concrete Containments." Although the reported actual tendon prestressing stresses measured during the last five surveillance tests (1971 through 1989) were larger than the required minimum design effective stresses of 137.4 ksi, 134.5 ksi, and 140.6 ksi for dome, hoop, and vertical tendons, respectively (values committed to in the FSAR), the staff was concerned about the use of the normalizing factors, which, if corrected, might result in the remaining prestressing stresses in the tendons being less than the above listed minimum design prestressing stresses. The staff's concerns and additional questions were sent to the licensee by letter on July 12, 1993. The licensee submitted its responses to the staff questions on September 13, 1993. The staff has reviewed this submittal, as discussed below.

2. EVALUATION

The licensee submitted new reconstructed tolerance bands of acceptable prestressing force in accordance with Regulatory Guide 1.35.1 on September 13, 1993, without using the normalizing factors. The licensee agreed with the staff that the normalizing factors, which had been used prior to this submittal, were not in accordance with the recommendations contained in the Regulatory Guide. The licensee also stated that the tendon prestressing force indicated on the new submittal are actual values without using the normalizing factors. The reconstructed tolerance bands of acceptable prestressing force are acceptable to the staff. To record the actual prestressing force in a tendon without using the normalizing factors is also acceptable to the staff.

The calculated upper bounds of prestressing stresses at the end of 40 years are 147.8 ksi, 145.1 ksi, and 150.8 ksi for dome, hoop, and vertical tendons, respectively. The calculated lower bounds of prestressing stresses at the end of 40 years are 137.4 ksi, 134.5 ksi, and 140.6 ksi for dome, hoop, and vertical tendons, respectively. These lower bound prestressing stress values are the same as those specified in the FSAR.

The licensee has plotted all the actual tendon prestressing force values together with the tolerance bands of acceptable prestressing force for dome, hoop, and vertical tendons for both units. The results indicate that all the actual tendon prestressing forces are above the lower bound values and most of the tendon forces are even above the upper bound values. This indicates that the average loss of prestressing tendon forces is less than the predicted ones.

The licensee agreed during a February 17, 1994, telephone conference that it would not use the normalizing factors to adjust the actual tendon prestressing force for future tendon surveillance reports. The licensee's commitment indicates that future reported tendon prestressing forces would also be determined using the appropriate techniques.

3. CONCLUSION

Based on the evaluation of the corrected results, the staff finds that the licensee has used appropriate methods to evaluate its tendon surveillance records and that the remaining prestressing tendon force is adequate to preserve the containment integrity.

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