

September 25, 1998

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING
PALISADES 25-YEAR CONTAINMENT INTEGRITY SURVEILLANCE REPORT

Consumers Energy submitted the Palisades' 25-Year Containment Integrity Report and the associated post surveillance regression analysis on December 18, 1997, and February 23, 1998. These submittals were made to meet the requirements of Technical Specification 6.6.8. On July 27, 1998, the NRC issued a request for additional information (RAI) related to this report. The attachment to this letter provides that information.

SUMMARY OF COMMITMENTS

This letter contains no new commitments and no revisions to existing commitments.



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Director, Licensing

CC Administrator, Region III, USNRC
Project Manager, NRR, USNRC
NRC Resident Inspector - Palisades

Attachment

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ATTACHMENT

**CONSUMERS ENERGY COMPANY
PALISADES PLANT
DOCKET 50-255**

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PALISADES 25-YEAR CONTAINMENT INTEGRITY SURVEILLANCE REPORT**

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NRC REQUESTED INFORMATION

1. *Table VIII, Attachment I (February 23, 1998 submittal): The predicted forces shown for sampled vertical, hoop and dome tendons indicate that the elastic shortening losses in all the tendons for each group (vertical, hoop and dome) are the same. This is possible only if all the tendons in that group were tensioned at the same time. For the comparison of individual tendon lift-off forces with the respective predicted forces, this distinction is important. Provide justification for using the same value of predicted forces. Also, provide information about how the time-dependent prestressing force losses (due to creep and shrinkage of concrete, and relaxation of prestressing steel) are incorporated in the predicted forces.*

CONSUMERS ENERGY RESPONSE

1. Review of prestressing records indicates each of the selected tendons was stressed during the period of time between May 16 and September 22, 1969. Based on the short period of time between the first and last tendon stressing date versus the 25 years of service, it was not necessary to individually calculate predicted stress levels for each tendon. The only exception is tendon V-126 which was removed and reinstalled during the Palisades Steam Generator Replacement Project in 1991. Tendon V-126 is discussed in our response to Question 2. To minimize the impact of subsequent tensioning of other tendons on the already tensioned tendons, normalization of jacking forces was performed. This normalization resulted in equal prestress loss for all tendons in each group (vertical, hoop and dome).

The effects of elastic shortening, creep and shrinkage of concrete and relaxation of prestressing steel are described in FSAR, Section 5.8.5.3. In accordance with ACI 318-63, elastic shortening, creep, shrinkage and tendon relaxation were considered in the design of the prestressing tendons. The required tendon prestressing forces for all the tendons were calculated to account for all the postulated losses.

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- Table VIII, Attachment I: The stresses in the wires of Tendon V-126 are above 70 percent of the guaranteed ultimate tensile strength of the wires at the 25-year surveillance. Factors such as improper lift-off, improper jack calibration, or high initial installation force could be responsible for such measured data. Provide an explanation for such high stresses in the tendon wires, including any history of prior measurements and initial installation data. It appears that the negative regression analysis line for the vertical tendons (Figure 5 of the February 23, 1998, submittal) is due to the high lift-off force of this tendon. Please verify the reliability of the lift-off reading, and explain the anomalous behavior of the vertical tendons.*

CONSUMERS ENERGY RESPONSE

- Per FSAR 5.8.9.2, during the 1990 steam generator replacement project, vertical tendons from approximately azimuth 49° to azimuth 189° were detensioned prior to removing the existing concrete from the temporary construction opening. Those tendons intersecting the construction opening were detensioned and removed. The retensioning forces were established to account for the projected tendon losses over the remaining plant life.

In accordance with FSAR Figure 5.8-30, vertical tendon V-126 was removed during the steam generator replacement project in 1990. Following replacement of the tendon, the required minimum lock-off force was 725 Kips. The Prestress Report for Steam Generator Replacement, Palisades Nuclear Plant, dated February 1991, Table 4-5 indicates V-126 lock-off force was 748.96 Kips. Based on this information, the 25-Year surveillance results indicated a 4 ksi loss in prestress for this tendon. The effect of this higher than expected lift-off value is a regression curve with positive slope.

A similar situation occurred with the 20-year surveillance results which included tendon V-128, also removed during the Steam Generator Replacement. The lift-off force of 680 Kips was greater than the predicted force by 7.01%. This tendon force skewed the average results for the 20-Year surveillance, also. Since the test scope for the 5th and 10th year surveillances selected tendons with lower lift-off averages, a regression curve with a positive slope is expected.