

March 2, 1995

Mr. Kurt M. Haas  
Plant Safety and Licensing Director  
Palisades Plant  
27780 Blue Star Memorial Highway  
Covert, MI 49043

SUBJECT: PALISADES PLANT - EXEMPTION FROM REQUIREMENTS OF 10 CFR 50.60,  
ACCEPTANCE CRITERIA FOR FRACTURE PREVENTION FOR LIGHT-WATER NUCLEAR  
POWER REACTORS FOR NORMAL OPERATION (TAC NO. M90650)

Dear Mr. Haas:

The Commission has issued the enclosed exemption from the requirements of 10 CFR 50.60, Acceptance Criteria for Fracture Prevention for Light-Water Nuclear Power Reactors for Normal Operation. This exemption permits using the safety margins recommended in the American Society of Mechanical Engineers Code Case N-514, "Low Temperature Overpressure Protection" in lieu of the safety margins required by Appendix G to 10 CFR Part 50.

A copy of the exemption is being forwarded to the Office of Federal Register for publication.

Sincerely,

Original signed by

John N. Hannon, Director  
Project Directorate III-1  
Division of Reactor Projects - III/IV  
Office of Nuclear Reactor Regulation

Docket No. 50-255

Enclosure:  
Exemption

cc w/encl:  
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Mr. Kurt M. Haas  
Consumers Power Company

Palisades Plant

cc:

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Resident Inspector Office  
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Covert, Michigan 49043

February 1995

UNITED STATES OF AMERICANUCLEAR REGULATORY COMMISSION

In the Matter of

CONSUMERS POWER COMPANY  
(Palisades Plant))  
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Docket No. 50-255

EXEMPTION

## I.

The Consumers Power Company (the licensee) is the holder of Facility Operating License No. DPR-20, which authorizes operation of the Palisades Plant at a steady-state reactor power level not in excess of 2530 megawatts thermal. This facility consists of one pressurized water reactor located at the licensee's site in Van Buren County, Michigan. The license provides, among other things, that the licensee is subject to all rules, regulations, and orders of the Commission now or hereafter in effect.

## II.

The regulation 10 CFR 50.60, "Acceptance Criteria for Fracture Prevention Measures for Light-water Nuclear Power Reactors for Normal Operation," states that all light-water nuclear power reactors must meet the fracture toughness and material surveillance program requirements for the reactor coolant pressure boundary as set forth in Appendices G and H to 10 CFR Part 50. Appendix G to 10 CFR Part 50 defines pressure/temperature (P/T) limits during any condition of normal operation, including anticipated operational occurrences and system hydrostatic tests to which the pressure boundary may be subjected over its service lifetime. 10 CFR 50.60(b) specifies that alternatives to the described requirements in Appendices G and H to 10 CFR

Part 50 may be used when an exemption is granted by the Commission under 10 CFR 50.12.

To prevent low temperature overpressure transients that would produce pressure excursions exceeding the ASME Appendix G P/T limits while the reactor is operating at low temperatures, the licensee installed a low temperature overpressure (LTOP) system. The system includes pressure-relieving devices called power-operated relief valves (PORVs). The PORVs are set at a pressure low enough so that if an LTOP transient occurred, the mitigation system would prevent the pressure in the reactor vessel from exceeding the Appendix G P/T limits. To prevent the PORVs from lifting as a result of normal operating pressure surges (e.g., reactor coolant pump starting, and shifting operating charging pumps) with the reactor coolant system in a water-solid condition, the operating pressure must be maintained below the PORV setpoint. In addition, in order to maintain seal integrity of the reactor coolant pump, the operator must maintain a differential pressure across the reactor coolant pump seals. Hence, the licensee must operate the plant in a pressure window that is defined as the difference between the minimum required pressure to start a reactor coolant pump and the operating margin to prevent lifting of the PORVs due to normal operating pressure surges. The licensee LTOP analysis indicates that using the ASME Appendix G safety margins to determine the PORV setpoint would result in a pressure setpoint within its operating window, but there would be no margin for normal operating pressure surges. Therefore, operating with these limits could result in the lifting of the PORVs and cavitation of the reactor coolant pumps during normal operation.

The licensee proposed in a letter dated February 10, 1995, that in determining the design setpoint for LTOP events for the Palisades Plant, the

allowable pressure be determined using the safety margins developed in an alternate methodology in lieu of the safety margins currently required by Appendix G to 10 CFR Part 50. Designated Code Case N-514, the proposed alternate methodology, is consistent with guidelines developed by the American Society of Mechanical Engineers (ASME) Working Group on Operating Plant Criteria to define pressure limits during LTOP events that avoid certain unnecessary operational restrictions, provide adequate margins against failure of the reactor pressure vessel, and reduce the potential for unnecessary activation of pressure-relieving devices used for LTOP. Code Case N-514, "Low Temperature Overpressure Protection," has been approved by the ASME Code Committee but not yet approved for use in Regulatory Guide 1.147. The content of this code case has been incorporated into Appendix G of Section XI of the ASME Code and published in the 1993 Addenda to Section XI. The NRC is revising 10 CFR 50.55a, which will endorse the 1993 Addenda and Appendix G of Section XI into the regulations.

An exemption from 10 CFR 50.60 is required to use the alternate methodology for calculating the maximum allowable pressure for the LTOP setpoint. By application dated February 10, 1995, the licensee requested an exemption from 10 CFR 50.60 for this purpose.

### III.

Pursuant to 10 CFR 50.12, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 50 when (1) the exemptions are authorized by law, will not present an undue risk to public health or safety, and are consistent with the common defense and security; and (2) when special circumstances are present. Special circumstances are present whenever, according to 10 CFR

50.12(a)(2)(ii), "Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule."

The underlying purpose of 10 CFR 50.60, Appendix G, is to establish fracture toughness requirements for ferritic materials of pressure-retaining components of the reactor coolant pressure boundary to provide adequate margins of safety during any condition of normal operation, including anticipated operational occurrences, to which the pressure boundary may be subjected over its service lifetime. Section IV.A.2 of this appendix requires that the reactor vessel be operated with P/T limits at least as conservative as those obtained by following the methods of analysis and the required margins of safety of Appendix G of the ASME Code.

Appendix G of the ASME Code requires that the P/T limits be calculated: (a) using a safety factor of 2 on the principal membrane (pressure) stresses, (b) assuming a flaw at the surface with a depth of one-quarter of the vessel wall thickness and a length of 6 times its depth, and (c) using a conservative fracture toughness curve that is based on the lower bound of static, dynamic, and crack arrest fracture toughness tests on material similar to the Palisades reactor vessel material.

In determining the setpoint for LTOP events, the licensee proposed to use safety margins based on an alternate methodology consistent with the proposed ASME Code Case N-514 guidelines. The ASME Code Case N-514 allows determination of the setpoint for LTOP events such that the maximum pressure in the vessel would not exceed 110% of the P/T limits of the existing ASME Appendix G. This results in a safety factor of 1.8 on the principal membrane stresses. All other factors, including assumed flaw size and fracture

toughness, remain the same. Using the licensee's proposed safety factors instead of ASME Appendix G safety factors to calculate the LTOP setpoint will permit a higher LTOP setpoint than would otherwise be required, but will provide added margin to prevent normal operating surges from lifting the PORVs or cavitation of the reactor coolant pumps. Although this methodology would reduce the safety factor on the principal membrane stresses, the proposed criteria will provide adequate margins of safety to the reactor vessel during LTOP transients, thus providing an acceptable level of quality and safety. Accordingly, the use of the Code case will satisfy the underlying purpose of 10 CFR 50.60 for fracture toughness requirements for normal operation and anticipated operational occurrences.

#### IV.

For the foregoing reasons, the NRC staff has concluded that the licensee's proposed use of the alternate methodology in determining the acceptable setpoint for LTOP events will not present an undue risk to public health and safety and is consistent with the common defense and security. The NRC staff has determined that there are special circumstances present, as specified in 10 CFR 50.12(a)(2)(ii), such that application of 10 CFR 50.60 is not necessary in order to achieve the underlying purpose of this regulation.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12(a), an exemption is authorized by law, will not endanger life or property or common defense and security, and is, otherwise, in the public interest. Therefore, the Commission hereby grants the Consumers Power Company an exemption from the requirements of 10 CFR 50.60 such that in determining the setpoint for LTOP events, the ASME Appendix G curves for P/T limits are not exceeded by more than 10% in order to be in compliance with these

regulations. This exemption is applicable only to LTOP conditions during normal operation.

Pursuant to 10 CFR 51.32, the Commission has prepared an environmental assessment and determined that the granting of this exemption will not have a significant effect on the quality of the human environment (February 27, 1995, 60 FR 10615).

This exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Original signed by

Elinor G. Adensam, Acting Director  
Division of Reactor Projects - III/IV  
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland,  
this 2nd day of March 1995.

\*See Previous Concurrence

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