

December 12, 1997

Ms. Irene M. Johnson, Acting Manager
Nuclear Regulatory Services
Commonwealth Edison Company
Executive Towers West III
1400 Opus Place, Suite 500
Downers Grove, IL 60515

SUBJECT: EXEMPTION FROM REQUIREMENTS OF 10 CFR 50.60 - BRAIDWOOD NUCLEAR STATION, UNIT 2 (TAC NO. M99600)

Dear Ms. Johnson:

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

A copy of this Exemption has been forwarded to the Office of the Federal Register for publication.

Sincerely,

Orig. signed by:
George F. Dick, Jr., Senior Project Manager
Project Directorate III-2
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Docket No. STN 50-457

Enclosure: Exemption

cc w/encl: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 12, 1997

Ms. Irene M. Johnson, Acting Manager
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Commonwealth Edison Company
Executive Towers West III
1400 Opus Place, Suite 500
Downers Grove, IL 60515

SUBJECT: EXEMPTION FROM REQUIREMENTS OF 10 CFR 50.60 - BRAIDWOOD NUCLEAR
STATION, UNIT 2 (TAC NO. M99600)

Dear Ms. Johnson:

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A copy of this Exemption has been forwarded to the Office of the Federal Register for publication.

Sincerely,

A handwritten signature in cursive script that reads "George F. Dick, Jr.".

George F. Dick, Jr., Senior Project Manager
Project Directorate III-2
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Docket No. STN 50-457

Enclosure: Exemption

cc w/encl: See next page

Braidwood Station
Unit Nos. 1 and 2

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of
COMMONWEALTH EDISON COMPANY
(Braidwood Nuclear Station,
Unit No. 2)

Docket No. STN 50-457

EXEMPTION

I.

Commonwealth Edison Company (ComEd, the licensee) is the holder of Facility Operating License No. NPF-77, which authorizes operation of the Braidwood Nuclear Station, Unit 2. 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.

In its letter dated November 30, 1994, as supplemented on May 11, 1995, the licensee requested an exemption from the Commission's regulations. Title 10 of the Code of Federal Regulations, Part 50, Section 60 (10 CFR 50.60), "Acceptance Criteria for Fracture Prevention Measures for Lightwater Nuclear Power Reactors for Normal Operation," states that all lightwater nuclear power reactors must comply with the fracture toughness and material surveillance program requirements for the reactor coolant pressure boundary as stated 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, and

that are obtained by conforming to the methods of analysis and the margins of safety in the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), Section XI, Appendix G. It is required in 10 CFR 50.55a that any reference to the ASME Code, Section XI, in 10 CFR Part 50 refers to the addenda through the 1988 Addenda and editions through the 1989 Edition of the Code unless otherwise noted. It is specified in 10 CFR 50.60(b) that alternatives to the described requirements in Appendix G to 10 CFR Part 50 may be used when an exemption is granted by the Commission under 10 CFR 50.12.

To mitigate low-temperature overpressure transients that would produce pressure excursions exceeding the required limits while the reactor is operating at low temperatures, the licensee installed a low-temperature overpressure protection (LTOP) system. The system contains pressure-relieving devices called power-operated relief valves (PORVs). The PORVs are set at a low enough pressure so that if an LTOP transient occurred, the mitigation system would prevent the pressure in the reactor vessel from exceeding the required limits. To prevent the PORVs from lifting as a result of normal operating pressure surges, some margin is needed between the PORV setpoint and the normal operating pressure. In addition, normal operating pressure must be high enough to prevent damage to reactor coolant pumps that may result from cavitation or inadequate differential pressure across the pump seals. Hence, the licensee must operate the plant within a pressure window that is defined as the difference between the minimum pressure required for reactor coolant pumps and the operating margin to keep the PORVs from lifting. When

instrument uncertainty is considered, the operating window is small and presents difficulties for plant operation.

The licensee has requested the use of the ASME Code Case N-514, "Low Temperature Overpressure Protection," for determining the LTOP system setpoint. Code Case N-514 allows use of an LTOP system setpoint so that system pressure does not exceed 110 percent of the P-T limits during an LTOP event. Code Case N-514 is consistent with guidelines developed by the 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. The content of this code case has been incorporated into the ASME Code, Section XI, Appendix G, and was published in the 1993 Addenda to Section XI.

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 (1) when 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 and 10 CFR Part 50, 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 Appendix G to 10 CFR Part 50 requires that the reactor vessel be operated with P-T limits at least as conservative as those obtained from following the methods of analysis and the required margins of safety of Appendix G of Section XI of the ASME Code.

Appendix G of the ASME Code requires that the P-T limits be calculated (1) using a safety factor of 2 on the principal membrane (pressure) stresses, (2) assuming a flaw at the surface with a depth of one-fourth of the vessel wall thickness and a length of 6 times its depth, and (3) 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 Braidwood reactor vessel material.

For determining the LTOP system setpoint, the licensee proposed to use safety margins based on an alternate methodology consistent with ASME Code Case N-514. The code case allows the setpoint for mitigating LTOP events to be so determined that the maximum pressure in the vessel would not exceed 110 percent of the Appendix G P-T limits. 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. Although this methodology would reduce the safety factor on the principal membrane stresses, the proposed

criteria will produce adequate margins of safety for the reactor vessel during LTOP transients and, thus, will satisfy the underlying purpose of 10 CFR 50.60 for fracture toughness requirements. Further, by relieving the operational restrictions, the potential for undesirable lifting of the PORVs would be reduced, thereby making the plant safer.

IV.

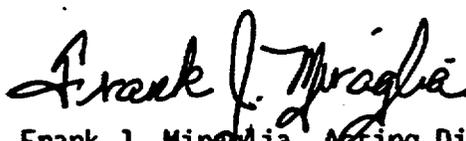
For the foregoing reasons, the NRC staff has concluded that the licensee's proposed use of the alternate methodology in determining the acceptable setpoint for LTOP events will not present an undue risk to public health and safety and is consistent with the common defense and security. The NRC staff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

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 the common defense and security, and is, otherwise, in the public interest. Therefore, the Commission hereby grants an exemption from the requirements of 10 CFR 50.60; in accordance with ASME Code Case N-514, the LTOP system setpoint may be determined so that system pressure does not exceed 110 percent of the Appendix G P-T limits 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 determined that granting this exemption will not have a significant effect on the quality of the human environment (62 FR 59008).

This exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Frank J. Minaglia, Acting Director
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland,
this 12th day of December 1997

Pursuant to 10 CFR 51.32, the Commission has determined that granting this exemption will not have a significant effect on the quality of the human environment (62 FR 59008).

This exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Original Signed By:

Frank J. Miraglia, Acting Director
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland,
this 12th day of December 1997

*see previous page for concurrence

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