

PDR

October 23, 1997

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

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

Dear Ms. Johnson:

Enclosed is a copy of an Environmental Assessment and Finding of No Significant Impact related to your application for an exemption from certain requirements of 10 CFR 50.60, "Acceptance Criteria for Fracture Prevention Measures for Lightwater Nuclear Power Reactors for Normal Operation," for Braidwood Station, Unit 2. The request was submitted by letter dated November 30, 1994, as supplemented on May 11, 1995. The proposed exemption would permit the use of 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, for the development of the low temperature overpressure protection system setpoints.

This assessment is being forwarded to the Office of the Federal Register for publication.

Sincerely,

ORIGINAL 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: Environmental Assessment

cc w/encl: See next page

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NAME	GDICK <i>h</i>	CMOORE	SBAILEY <i>S</i>	TSULLIVAN <i>ell</i>	TESSIG <i>ell</i>	<i>Ubal</i>	RCAPRA <i>an</i>
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UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

October 23, 1997

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Nuclear Regulatory Services
Commonwealth Edison Company
Executive Towers West III
1400 Opus Place, Suite 500
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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: Environmental Assessment

cc w/encl: See next page

I. Johnson
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Unit Nos. 1 and 2

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UNITED STATES NUCLEAR REGULATORY COMMISSIONCOMMONWEALTH EDISON COMPANYDOCKET NO. STN 50-457BRAIDWOOD STATION, UNIT 2ENVIRONMENTAL ASSESSMENT AND FINDING OFNO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (the Commission) is considering issuance of an exemption from certain requirements of its regulations for Facility Operating License No. NPF-77, issued to Commonwealth Edison Company, (ComEd, the licensee), for operation of the Braidwood Station, Unit 2, located in Will County, Illinois.

ENVIRONMENTAL ASSESSMENTIdentification of the Proposed Action:

The proposed action would permit the licensee to use the alternate methodology in American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Case N-514, "Low Temperature Overpressure Protection," to determine the low temperature overpressure protection (LTOP) system setpoints. By application dated November 30, 1994, as supplemented by letter dated May 11, 1995, the licensee requested an exemption from certain requirements of 10 CFR 50.60, "Acceptance Criteria for Fracture Prevention Measures for Lightwater Nuclear Power Reactors for Normal Operation." The exemption would allow application of an alternate methodology to determine the LTOP system setpoints for Braidwood, Unit 2. The proposed alternate methodology 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. These guidelines have been incorporated into the 1993 Addenda to the ASME Code, Section XI, Appendix G. However, 10 CFR 50.55a, "Codes and Standards," has not been updated to reflect the acceptability of the 1993 Addenda to the ASME Code.

The Need for the Proposed Action:

Pursuant to 10 CFR 50.60, all lightwater nuclear power reactors must meet the fracture toughness requirements for the reactor coolant pressure boundary as set forth in 10 CFR Part 50, Appendix G. Appendix G of 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 specifies that these P-T limits must be at least as conservative as the limits obtained by following the methods of analysis and the margins of safety of the ASME 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 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 10 CFR Part 50, Appendix G, may be used when an exemption is granted by the Commission under 10 CFR 50.12.

To prevent transients that would produce excursions exceeding the P-T limits while the reactor is operating at low temperatures, the licensee installed the LTOP system, which includes pressure relieving devices called power-operated relief valves (PORVs). The PORVs prevent the pressure in the

reactor vessel from exceeding the P-T limits. However, to prevent the PORV from lifting as a result of normal operating pressure surges, some margin is needed between the normal operating pressure and the PORV setpoint. 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 in a pressure window that is defined as the difference between the minimum pressure required for reactor coolant pumps and the operating margin to prevent lifting of the PORVs. When instrument uncertainty is considered, the operating window is small and presents difficulties for plant operation.

To meet the 10 CFR Part 50, Appendix G, P-T limits, the PORVs would be set to open at a pressure very close to the normal pressure inside the reactor. With the PORV setpoint close to the normal operating pressure, minor pressure perturbations that typically occur in the reactor could cause the PORVs to open. This is undesirable from the safety perspective because after every PORV opening there is some concern that the PORV may not reclose. A stuck open PORV would continue to discharge primary coolant and reduce reactor pressure until the discharge pathway was closed by operator action.

The licensee requested use of the ASME Code Case N-514, "Low Temperature Overpressure Protection," for the determination of the PORV setpoints. This code case would permit a slightly higher PORV setpoint during low-temperature shutdown conditions. This would reduce the likelihood for inadvertent opening of the PORVs.

Appendix G of the ASME Code requires that the P-T limits be calculated:

- (a) using a safety factor of two on the principal membrane (pressure)

stresses, (b) assuming a flaw at the surface with a depth of one quarter (1/4) of the vessel wall thickness and a length of six (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 Braidwood reactor vessel material.

ASME Code Case N-514 requires that the system pressure is maintained below the P-T limits during normal operation, but allows the pressure that may occur with the activation of pressure relieving devices (PORVs) to exceed the P-T limits, provided acceptable margins are maintained during these events. This approach protects the pressure vessel from LTOP events, and maintains the Technical Specification P-T limits applicable for normal heatup and cooldown in accordance with 10 CFR Part 50, Appendix G, and Sections III and XI of the ASME Code.

In determining the PORV setpoint for LTOP events, the licensee proposed to use the safety margins of ASME Code Case N-514. This alternate methodology allows determination of the setpoint for LTOP events such that the maximum pressure in the vessel will not exceed 110 percent of the P-T limits. This results in a safety factor of 1.8 on the principal membrane stresses. All other factors, including the assumed flaw size and fracture toughness, remain the same. Although this methodology would reduce the safety factor on the principal membrane stresses, use of the proposed criteria will provide adequate margins of safety for the reactor vessel during LTOP events.

Use of the Code Case N-514 safety margins will reduce operational challenges during low temperature, low pressure operations. In terms of overall safety, the safety benefits derived from simplified operations and the

reduced potential for undesirable opening of the PORVs will more than offset the reduction of the principal membrane safety factor. Reduced operational challenges will reduce the potential for undesirable impacts to the environment.

Environmental Impacts of the Proposed Action:

The proposed action involves features located entirely within the protected area as defined in 10 CFR Part 20.

The proposed action will not result in an increase in the probability or consequences of accidents or result in a change in occupational or offsite dose. Therefore, there are no radiological impacts associated with the proposed action.

The proposed action will not result in a change in nonradiological plant effluent and will have no other nonradiological environmental impact.

Accordingly, the Commission concludes that there are no environmental impacts associated with this action.

Alternatives to the Proposed Action:

Since the Commission has concluded there is no measurable environmental impact associated with the proposed action, any alternatives with equal or greater environmental impact need not be evaluated. As an alternative to the proposed action, the staff considered denial of the proposed action. Denial of the application would result in no change in current environmental impacts. The environmental impacts of the proposed action and the alternative action are similar.

Alternative Use of Resources:

This action does not involve the use of any resources not previously considered in the Final Environmental Statement for the Braidwood Station.

Agencies and Persons Consulted:

In accordance with its stated policy, on October 22, 1997, the staff consulted with the Illinois State official, Frank Niziolek of the Illinois Department of Nuclear Safety, regarding the environmental impact of the proposed action. The State official had no comments.

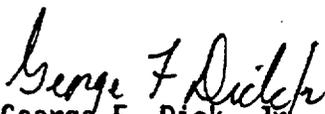
FINDING OF NO SIGNIFICANT IMPACT

Based upon the environmental assessment, the Commission concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the Commission has determined not to prepare an environmental impact statement for the proposed action.

For further details with respect to the proposed action, see the licensee's letter dated November 30, 1994, as supplemented by letter dated May 11, 1995, which are available for public inspection at the Commission's Public Document Room, The Gelman Building, 2120 L Street, NW., Washington, DC, and at the local public document room located at the Wilmington Public Library, 201 S. Kankakee Street, Wilmington, Illinois 60481.

Dated at Rockville, Maryland, this 23 day of October 1997.

FOR THE NUCLEAR REGULATORY COMMISSION


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