

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)	
COMMONWEALTH EDISON COMPANY)	Docket Nos. STN 50-454
(Byron Station, Units 1 and 2))	STN 50-455

EXEMPTION

I.

Commonwealth Edison Company (ComEd, the licensee) is the holder of Facility Operating License Nos. NPF-37 and NPF-66, which authorize operation of Byron Station, Units 1 and 2, respectively. The licenses provide, among other things, that the licensee is subject to all rules, regulations, and orders of the Commission now or hereafter in effect.

The facility consists of two pressurized-water reactors located at the licensee's site in Ogle County, Illinois.

II.

In its letter dated March 14, 1996, 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 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. It is specified in 10 CFR 50.60(b) 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 P/T limits of Appendix G to 10 CFR Part 50 while the reactor is operating at low temperatures, the licensee installed a low-temperature overpressure protection (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 P/T limits of Appendix G to 10 CFR Part 50. To prevent the PORVs from lifting as a result of normal operating pressure surges (e.g., starting reactor coolant pumps, and shifting operating charging pumps) with the reactor coolant system in a solid water condition, the operating pressure must be maintained below the PORV setpoint. Applying LTOP instrument uncertainties as required by WCAP-14040, Revision 1, results in an LTOP setpoint that would have resulted in an operating window between the LTOP setpoint and the minimum pressure required for reactor coolant pump seals, which is too small to permit continued operation.

The licensee has requested the use of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Case N-514, "Low Temperature Overpressure Protection," which allows exceeding the safety limits of 10 CFR Part 50, Appendix G, by 10 percent. ASME Code Case N-514, 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. ASME Code Case N-514 has been approved by the ASME Code Committee. 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.

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 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 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 Section XI 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 Byron 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 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 percent of the P/T limits of the existing ASME Code, Section XI, Appendix G. This approach 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 provide adequate margins of safety to 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 PORV would be reduced, thereby improving plant safety.

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), in 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 an exemption from the requirements of 10 CFR 50.60 such that in determining the setpoint for LTOP events, the Appendix G curves for P/T limits are not exceeded by more than 10 percent 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 the granting of this exemption will not have a significant effect on the quality of the human environment (61 FR 37294).

This exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/s/

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

Dated at Rockville, Maryland,
this 29th day of Nov. 1996

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