

May 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

SUBJECT: ISSUANCE OF EMERGENCY AMENDMENT (TAC NO. M98783)

Dear Ms. Johnson:

The U.S. Nuclear Regulatory Commission (Commission) has issued the enclosed Amendment No. 83 to Facility Operating License No. NPF-72 for the Braidwood Station, Unit No. 1. The amendment is in response to your applications dated May 23, 1997 (two letters).

The amendment revises Technical Specification 4.5.2.b.1 to include the use of ultrasonic testing (UT) to verify that the emergency core cooling system (ECCS) is completely filled with water. For the ECCS subsystems with high point vent valves in direct communication with the operating systems, UT is acceptable in lieu of physically opening the vents.

A copy of the related Safety Evaluation is also enclosed. Notice of Issuance of Amendment to Facility Operating License and Final Determination of No Significant Hazards Consideration and Opportunity for Hearing will be included in the Commission's biweekly Federal Register notice.

Sincerely,

Robert A. Capra, Director
Project Directorate III-2
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Docket No. STN 50-456

Enclosures: 1. Amendment No. 83 to NPF-72
2. Safety Evaluation

cc w/encl: see next page

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DOCUMENT NAME: BRM98783.AMD *See Previous Concurrence

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

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Sincerely,

A handwritten signature in black ink, appearing to read "Robert A. Capra".

Robert A. Capra, Director
Project Directorate III-2
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Docket No. STN 50-456

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cc w/encl: see next page

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Commonwealth Edison Company

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

COMMONWEALTH EDISON COMPANY

DOCKET NO. STN 50-456

BRAIDWOOD STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 83
License No. NPF-72

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Commonwealth Edison Company (the licensee) dated May 23, 1997 (two letters), complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-72 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 83 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert A. Capra, Director
Project Directorate III-2
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: May 23, 1997

ATTACHMENT TO LICENSE AMENDMENT NO. 83

FACILITY OPERATING LICENSE NO. NPF-72

DOCKET NO. STN 50-456

Replace the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by amendment number and contain vertical lines indicating the area of change.

Remove Pages

3/4 5-4

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B 3/4 5-2

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Insert Pages

3/4 5-4

3/4 5-4a

3/4 5-4b

B 3/4 5-2

B 3/4 5-2a

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS

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EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS

4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

- a. At least once per 12 hours by verifying that the following valves are in the indicated positions with power to the valve operators removed:

<u>Valve Number</u>	<u>Valve Function</u>	<u>Valve Position</u>
MOV SI8806	Suction to the SI Pumps	Open
MOV SI8835	SI Pump Discharge To RCS Cold Legs	Open*
MOV SI8813	SI Pump Recirculation To The RWST	Open
MOV SI8809A	RHR Pump Discharge to RCS Cold Legs	Open*
MOV SI8809B	RHR Pump Discharge to RCS Cold Legs	Open*
MOV SI8840	RHR Pump Discharge to RCS Hot Legs	Closed
MOV SI8802A	SI Pump Discharge to RCS Hot Legs	Closed
MOV SI8802B	SI Pump Discharge to RCS Hot Legs	Closed

- b. For Unit 1, through Cycle 7, at least once per 31 days by:
 - 1) Venting the pump casings and discharge piping high point vent valves outside of containment (applicable to idle RH and SI system only), and
 - 2) Verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position (applicable to CV, RH, SI system).
 - 3) Verifying the CV system is full of water by ultrasonically examining the discharge portion of the idle CV pump up to the discharge check valve and the stagnant portion of the piping upstream of 1SI8801A and B at the 1SI045 valve (applicable to CV system only).
- c. By a visual inspection which verifies that no loose debris (rags, trash, clothing, etc.) is present in the containment which could be transported to the containment sump and cause restriction of the pump suction during LOCA conditions. This visual inspection shall be performed:

*Valves may be realigned for testing pursuant to Specification 4.4.6.2.2.

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS

4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

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MOV SI8840	RHR Pump Discharge to RCS Hot Legs	Closed
MOV SI8802A	SI Pump Discharge to RCS Hot Legs	Closed
MOV SI8802B	SI Pump Discharge to RCS Hot Legs	Closed

- b. At least once per 31 days by:
- 1) Venting the ECCS pump casings and discharge piping high points outside of containment, and
 - 2) Verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.
- c. By a visual inspection which verifies that no loose debris (rags, trash, clothing, etc.) is present in the containment which could be transported to the containment sump and cause restriction of the pump suction during LOCA conditions. This visual inspection shall be performed:

*Valves may be realigned for testing pursuant to Specification 4.4.6.2.2.

BASESECCS SUBSYSTEMS (Continued)

The limitation for a maximum of one centrifugal charging pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps except the required OPERABLE Charging pump to be inoperable in MODE 4 with one or more of the RCS cold legs less than or equal to 330°F, MODE 5, and MODE 6 with the reactor vessel head on, provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV or RHR suction relief valve. Similarly, the requirement to verify all Safety Injection pumps are inoperable in MODE 4 with the temperature of one or more of the RCS Cold Legs less than or equal to 330°F, in MODE 5 with pressurizer level greater than 5 percent (Level 409.5') and in MODE 6 with pressurizer level greater than 5 percent and the reactor vessel head resting on the reactor vessel flange, provides assurance that a mass addition pressure transient can be relieved by a single PORV or RHR suction relief valve.

In MODE 5 and MODE 6 with pressurizer level less than or equal to 5 percent, at least one Safety Injection pump or gravity feed from the RWST must be available to mitigate the effects of a loss of decay heat removal during partially drained conditions. Surveillance requirements assure availability, but prevent inadvertent actuation during these modes. The desired flow path for the SI pump or gravity feed varies with RCS configuration and is, therefore, procedurally addressed.

The Surveillance Requirements define what constitutes an adequate hot side vent for various plant conditions. It was determined that removing the reactor vessel head was an adequate vent under all conditions. Other venting alternatives have restrictions based on time from shutdown and RCS temperature. The values in the surveillance were taken from the graph on page B 3/4 5-3.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the safety analyses are met and that subsystem OPERABILITY is maintained. Surveillance Requirements for throttle valve position stops and flow balance testing provide assurance that proper ECCS flows will be maintained in the event of a LOCA. Maintenance of proper flow resistance and pressure drop in the piping system to each injection point is necessary to: (1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration, (2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and (3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS-LOCA analyses. The Surveillance Requirements for leakage testing of ECCS check valves ensures that a failure of one valve will not cause an intersystem LOCA. In Mode 3, with pressurizer pressure below 1000 psig, the accumulators will be available with their isolation valves either closed but energized, or open, whenever a SI8809 valve is closed to perform check valve leakage testing.

For Unit 1, Surveillance Requirement 4.5.2.b.1 requires that the ECCS pump casings and discharge piping high points equipped with vent valves be vented on a 31 day frequency. This venting surveillance does not apply to subsystems in communication with operating systems because the flows and/or pressures prevalent in these systems are sufficient to provide confidence that voiding

EMERGENCY CORE COOLING SYSTEMS

BASES

ECCS SUBSYSTEMS (Continued)

which could result in unacceptable dynamic loadings will not occur. During normal operation, this exclusion would apply to the High Head Safety Injection subsystem. During shutdown cooling operation, the exclusion would apply to the single required Centrifugal Charging pump and operating RH pump, in addition to the ECCS piping in communication with the operating pumps. Because the centrifugal charging pumps are not equipped with pump casing vent valves, and the pump design and system piping configuration allow the pumps to be maintained under positive pressure when in standby, manual venting of these pumps is not required.

The surveillance requirement to ultrasonically examine selected portions of piping involves the idle CV pump discharge piping up to the first check valve on the pump discharge and miniflow lines, and the stagnant portion of the piping upstream of the 1SI8801 A/B adjacent to the vent valve 1SI045. This will provide added assurance that the piping is water solid.



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 83 TO FACILITY OPERATING LICENSE NO. NPF-72

COMMONWEALTH EDISON COMPANY

BRAIDWOOD STATION, UNIT NO. 1

DOCKET NO. STN 50-456

1.0 INTRODUCTION

By two letters dated May 23, 1997, Commonwealth Edison Company (ComEd, the licensee) requested an emergency license amendment for Braidwood, Unit 1; the second letter superseded the first in its entirety. During discussions with the NRC concerning a plugged emergency core cooling system (ECCS) pump vent line at Byron, Unit 2, the licensee was made aware that their practices for venting chemical and volume (CV) control system (CVCS) discharge piping high points did not reflect precise compliance with Technical Specification (TS) 4.5.2.b.1. The purpose of venting is to verify that the piping is full of water. The CVCS high point vent is in a section of piping that is pressurized by the CV pump(s) and should not be opened during plant operation. Following the discussion with the NRC staff, the licensee submitted a change to the TS to include an alternate method (ultrasonic examination) as a means to ensure that the ECCS is completely full of water.

2.0 EVALUATION

TS 4.5.2.b.1 requires that the ECCS pump casings and discharge piping high points outside of containment be vented at least once per 31 days. The ECCS is comprised of the CV pumps, Safety Injection (SI) system pumps, Residual Heat Removal (RH) pumps and associated piping. The SI and RH pumps are provided with pump casing vents. The CV pumps are of a self-venting design with both suction and discharge piping on the top of the pump casing. No casing vents were provided with the CV pumps in this design. The ECCS discharge piping for Braidwood, Unit 1, is provided with vents located at high points throughout the system; both inside and outside containment.

During power operations, one CV pump is in operation and the other pump is in standby. The operating pump is continuously vented via flow through the system. The non-operating pump is designed to be self-venting since both the suction and discharge piping are located at the top of the pump casing. The discharge piping containing the high point vent (1/2SI045) is at full CV pump discharge pressure and, therefore, it is not appropriate from an equipment reliability and personnel safety standpoint to open the valve for venting purposes.

By letters dated March 17, 1989, August 25, 1989, March 12, 1990, and June 10, 1991, ComEd submitted a TS amendment request to discontinue the performance of the venting surveillance requirement (SR) for the ECCS piping inside containment for Braidwood. The staff reviewed and approved that request in the June 22, 1992, Safety Evaluation (SE) related to Amendment No. 36 for each of the Braidwood Units.

In the submittals, the licensee provided results of water hammer analyses that were performed to support the proposed changes. Based on their analyses, the licensee concluded that if air is present in the ECCS piping inside containment, the system is capable of withstanding the resulting water hammer event. However, the Illinois Department of Nuclear Safety (IDNS) had concerns regarding the consequences of the licensee's proposed changes. An analysis performed by IDNS determined the maximum pressure peak as a function of voided pipe volume. The analysis indicated that when a relatively small void volume exists (approaching the zero limit), the peak pressures experienced by the piping during a water hammer event are similar to those caused by the sudden opening of valves, pump startups, etc., and are of no concern. However, the worst case scenario is represented by a voided volume of approximately 12 cubic feet. At this volume, the peak pressure was calculated to exceed 600 psig, the setpoint of the discharge relief valve of the RH system. A loss of low head ECCS capability or an intersystem loss-of-coolant accident may result if the relief valve opens and fails to reseal once the pressure is relieved.

While the above is an example related to the RH system, in the June 22, 1992, staff SE, the staff concluded that, in general, the calculations and analytical methods used in determining the effects of water hammer for any system are uncertain in nature due to computer code limitations. Therefore, the staff did not base approval of the amendments on the water hammer analyses, but instead, on operational experience. In approval of that request, the staff considered the small likelihood of air intrusion in the piping system and the adequacy of licensee controls to ensure a water filled system (e.g., maintenance practices, operational experience, and procedural controls). Therefore, the staff again notes that conclusions reached in this evaluation are based on the licensee's other justifications (i.e., ultrasonic testing) and not on the licensee's water hammer analyses.

As an alternative to venting, the licensee performed ultrasonic testing which verified that the piping was full of water at the high point of the piping between the pump discharge and the normally closed containment isolation valves. The testing was performed in accordance with ComEd approved procedure NDT-C-28, Revision 0, "Ultrasonic Pulse Echo Detection of Water Levels in Piping," which requires use of acceptable techniques and personnel qualified to the American Society of Nondestructive Testing ASNT-TC-1A, "Recommended Practice for Nondestructive Testing, Personnel Qualifications and Certification." Ultrasonic testing equipment is calibrated using a pipe full of water. If gas voids exist at the top of the pipe, the liquid level in the horizontal pipe is determined by taking the ratio of the sweep length to the

reflection of the liquid surface to the sweep length of the calibration pipe diameter back-reflection.

Based upon the testing performed by the licensee to ensure the SR intent is met and that the piping is filled with water, the staff concluded that the proposed change is acceptable. This is consistent with the Standard Technical Specifications Westinghouse Plants, NUREG-1431, Revision 1, issued April 1995, which includes SR 3.5.2.3 to "Verify ECCS piping is full of water." Both the SR and the basis for the SR are performance based and not prescriptive on how the licensee is to perform the verification. The licensee requested the proposed changes for one operating cycle. The staff found this acceptable because it is considering the generic aspects of gas intrusion into piping, and intends to address this issue generically.

3.0 TECHNICAL SPECIFICATION CHANGES

TS 4.5.2.b.1 is revised to require that each ECCS subsystem be demonstrated operable at least once per 31 days by venting the ECCS pump casings and discharge piping high points outside of containment that are equipped with high point vent valves for subsystems not in direct communication with operating systems. An expanded bases discussion will be added to clarify that only the RH and SI pumps are equipped with pump casing vent valves. Additionally, the bases will note that the CV subsystem will not normally be vented, and the operating train of RH will not be vented while shutdown cooling is in operation. Additionally, a new TS requirement is added to ultrasonically examine the discharge piping of the idle centrifugal pump and the portion of the piping upstream of the High Head Safety Injection isolation valves (1SI8801A&B) on a monthly basis adjacent to the vent valve 1SI045.

4.0 EMERGENCY CIRCUMSTANCES

Promptly after identifying the venting question, the licensee completed testing to verify the actual conditions in the flow path and submitted the amendment request in a timely manner. Further, the licensee requested emergency processing to allow the plant to resume operation. Braidwood, Unit 1, is about to restart from its sixth refueling outage and is in Mode 3. Failure to grant the amendment would prevent resumption of operation. Accordingly, the Commission finds that an emergency situation exists pursuant to 10 CFR 50.90(a)(5). Throughout this process, the licensee acted promptly and kept the staff informed regarding the status of its activities. The staff finds that the licensee did not create the emergency situation and acted promptly once it became aware of the venting question.

5.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

As required by 10 CFR 50.91(a), the licensee has provided their analysis of the issue of no significant hazards consideration. The NRC staff has reviewed

the licensee's analysis against the standards of 10 CFR 50.92(c). The staff's review is presented below.

Since the level of surveillance performed to date has provided confidence that no significant voiding has occurred and the ultrasonic examinations have confirmed that the water solid conditions exist in the piping, operation of the facility under the proposed amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated.

The purpose of the SR is to verify that the flow path does not contain noncondensibles to ensure that previously identified accident scenarios are minimized. The licensee has implemented adequate controls to assure that air intrusion is unlikely. This change will not result in a new failure mode because no new equipment is installed, and installed equipment is not operated in a new or different manner. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Since the licensee has determined by an alternate means of verification that a significant volume of noncondensibles has not accumulated, this change does not involve a significant reduction in a margin of safety.

Accordingly, the staff has made a final determination that the proposed amendment involves no significant hazards consideration.

6.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Illinois State official was notified of the proposed issuance of the amendment. The State official had no comments.

7.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has made a final no significant hazards finding with respect to this amendment. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

8.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: M. Shuaibi
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L. Gundrum
G. Dick

Date: May 23, 1997