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May 24, 1997

United States Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D.C. 20555-0001

Subject: Application for EXIGENT Amendment to Appendix A, Technical Specifications for Facility Operating License:

Byron Nuclear Power Station, Units 1 and 2  
Facility Operating Licenses NPF-37 and NPF-66  
NRC Docket Nos. 50-454 and 50-455

Braidwood Nuclear Power Station, Unit 2  
Facility Operating License NPF-77  
NRC Docket No. 50-457

"Emergency Core Cooling System Venting"

Pursuant to Title 10, Code of Federal Regulations, Part 50, Section 90 (10 CFR 50.90), Commonwealth Edison Company (ComEd) proposes to amend Appendix A, Technical Specifications, for Facility Operating Licenses NPF-37, NPF-66 and NPF-77 for Byron Nuclear Power Station, Units 1 and 2, (Byron) and Braidwood Nuclear Power Station, Unit 2 (Braidwood), respectively. ComEd proposes to revise Technical Specification Surveillance Requirement (TSSR) 4.5.2 b and associated bases. These changes will be applicable to the end of each unit's current operating cycle.

ComEd requests that the United States Nuclear Regulatory Commission (NRC) Staff process this proposed license amendment request as an EXIGENT as defined in 10 CFR 50.91(a)(6). Byron, Units 1 and 2, and Braidwood, Unit 2, are currently operating in Mode 1, Power Operation, at, or near, 100% rated thermal power. An EXIGENT

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situation exists when the licensee and Commission must act quickly and that time does not permit the Commission to publish a Federal Register notice allowing 30 days for prior public comment. This EXIGENT situation occurred because it was identified on May 22, 1997, that Byron and Braidwood were not in literal compliance with the wording of TSSR 4.5.2.b.1. Byron and Braidwood considered themselves in compliance with the requirement by crediting the dynamic venting action of the system in operation as meeting the requirement to ensure that the ECCS piping is full of water. For the piping not directly in the flowpath, gas accumulation was judged not to be credible due to the pressure prevalent in the piping. The idle centrifugal charging pump was considered to be self-venting due to the the system design and piping configuration. Due to these circumstances, a opportunity to make a timely application did not exist. A Notice of Enforcement Discretion was granted verbally at 1740 (EDT) on May 23, 1997, to allow Byron, Units 1 and 2, and Braidwood, Unit 2, to continue to operate while this EXIGENT license amendment request is being processed.

A detailed description of the proposed changes are included in Attachment A.

A markup of the actual Technical Specification (TS) pages is included in Attachment B.

The proposed changes in this license amendment request have been reviewed and approved by both On-site and Off-site Review in accordance with ComEd procedures. ComEd has reviewed this proposed license amendment request in accordance with 10 CFR 50.92(c) and has determined that no significant hazards considerations exist. The No Significant Hazards Determination is included as Attachment C.

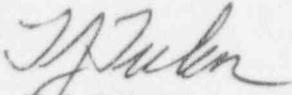
An environmental assessment has been completed and is included as Attachment D.

ComEd is notifying the State of Illinois of our application for this license amendment request by transmitting a copy of this letter and its attachments to the designated State Official.

To the best of my knowledge and belief, the statements contained in this document are true and correct. In some respects these statements are not based on my personal knowledge, but on information furnished by other ComEd employees, contractor employees, and/or consultants. Such information has been reviewed in accordance with company practice, and I believe it to be reliable.

Please address any comments or questions regarding this matter to Terrence W. Simpkin, Braidwood Regulatory Assurance Supervisor, at (815)458-2801, extension 2980.

Sincerely,



T. J. Tulon  
Station Manager  
Braidwood Nuclear Generating Station

Attachments

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cc: A. B. Beach, Regional Administrator - RIII  
G. F. Dick Jr., Byron/Braidwood Project Manager - NRR  
S. D. Burgess, Senior Resident Inspector - Byron  
C. J. Phillips, Senior Resident Inspector - Braidwood  
Office of Nuclear Facility Safety - IDNS

Signed before me

on this 24<sup>th</sup> day of May, 1997

by Michele McGrath  
Notary Public



# ATTACHMENT A

## DESCRIPTION AND SAFETY ANALYSIS OF PROPOSED CHANGES TO APPENDIX A TECHNICAL SPECIFICATIONS OF FACILITY OPERATING LICENSES NPF-37, NPF-66 and NPF-77

### A. DESCRIPTION OF THE PROPOSED CHANGE

Commonwealth Edison (ComEd) proposes to revise Byron, Units 1 and 2, and Braidwood Unit 2 Technical Specification (TS) 4.5.2.b.1 and associated bases as they relate to the requirement to vent the Emergency Core Cooling System (ECCS) pump casings and discharge piping high points outside containment. The change will revise the venting requirement to encompass the non-operating ECCS pumps and discharge piping which are provided with high point vent valves. Those portions of the ECCS systems which are in communication with operating system pressure and/or flow will not be required to be vented. This would normally encompass the High Head Safety Injection (CV) subsystem during Modes 1-4 operation, and the Low Head Safety Injection Subsystem (RH) during periods when shutdown cooling is in operation. Additionally, the wording of the surveillance will be revised to clearly indicate that the installed high point vent valves and pump casing vent valves will be utilized to accomplish the venting operation. The Intermediate Head Safety Injection (SI) subsystem and the RH subsystem are equipped with pump casing vents. The centrifugal CV pumps are not equipped with pump casing vent valves due to the configuration of the suction and discharge piping. Both the suction and discharge piping enter the pump casing from the top, so the pumps are essentially self-venting. Finally, a new 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 (SI8801A and B) adjacent to the vent valve SI045 every 31 days. These changes are required to align the surveillance requirement with the physical construction of the installed piping, and accommodate operating conditions which preclude cycling the installed high point vent valves during system operation, while continuing to provide assurance that the ECCS piping remains water solid. These changes will be applicable only until the end of the current cycle for each unit.

These proposed changes are discussed in detail in Section E of this attachment. The affected TS and bases pages showing the proposed revisions are included in Attachments B-1 and B-2 of this request.

## **B. DESCRIPTION OF THE CURRENT REQUIREMENT**

TS 4.5.2.b.1 requires that once per 31 days, the ECCS pump casings and discharge piping high points outside of containment be vented.

## **C. BASES FOR THE CURRENT REQUIREMENT**

The bases for the current requirement is to provide confidence that the ECCS piping is filled with water, and that voiding which could result in unacceptable dynamic loading from water hammer be precluded. This will help ensure that the ECCS systems will be capable of performing their design function.

## **D. NEED FOR REVISION OF THE REQUIREMENT**

The wording of the current TS is not appropriate for those portions of the ECCS subsystems which are in operation. These subsystems are not subject to significant voiding. The wording of the current TS also does not clearly recognize that installed features will be utilized to accomplish the venting activity. The surveillance requirement will be revised to require that only those trains of Intermediate Head Safety Injection (SI) and Low Head SI (RH) which are not in operation will be vented every 31 days. Additionally, the CV system discharge piping downstream of an idle pump is not provided with a high point vent valve. To ensure the piping downstream of the idle pump is water solid, this piping will be ultrasonically (UT) examined every 31 days. UT examination of the CV discharge piping high point at vent valve SI045 will also be performed. These changes will better align the venting requirements with the installed piping and vent valve configuration, and preclude the obvious safety concern with venting subsystems which are in operation.

## **E. DESCRIPTION OF THE REVISED REQUIREMENT**

TS 4.5.2.b will be revised to be applicable only until completion of the current cycle for each unit (cycle 8 for Byron Unit 1, cycle 7 for Byron Unit 2 and cycle 6 for Braidwood Unit 2).

TS 4.5.2.b.1 will be revised to require venting the pump casings and discharge piping high point vent valves outside of containment, as applicable to idle RH and SI systems. TS 4.5.2.b.2 will be revised to identify that it is applicable to CV, RH, and SI systems. A new item TS 4.5.2.b.3 will be added to provide the requirements for determining that the CV system is filled with water. These requirements include UT examination of the discharge piping of the idle centrifugal pump and the portion of the piping upstream of the High Head Safety Injection isolation valves (SI8801A and B) adjacent to the vent valve SI045 every 31 days. Industry experience has shown that UT examination is effective for identifying voided piping. The UT process is procedurally controlled at ComEd.

An expanded bases discussion will be added to clarify that only the RH and SI pumps are equipped with pump casing vent valves. Additionally, it 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. The bases discussion will indicate that these changes are only applicable until the end of the current cycle for each unit.

#### **F. BASES FOR THE REVISED REQUIREMENT**

The bases for the revised requirement is unchanged from that of the original requirement. The purpose of venting the non-operating subsystems is to ensure that the piping is full of water and to provide confidence that water hammer which could result from voiding would not result in unacceptable dynamic loads. Those subsystems which will not be manually vented are in communication with an operating system and subject to system flow and/or pressure. For the CV subsystem, the non-active portion of piping upstream of the injection line isolation valves is subjected to CV pump discharge pressure of approximately 2500 psia. The pumps are designed and installed to be virtually self-venting, and are not provided with casing vent valves. The design of the pump places the suction and discharge piping at the top of the pump casing. The CV suction piping is in communication with either the Refueling Water Storage Tank (RWST) or the Volume Control Tank (VCT). Both of these sources provide a net positive suction pressure for the pumps.

For the RH subsystem in operation during shutdown cooling, the piping which is excluded from manual venting is subjected to a pressure of approximately 360 psia and flows which vary from approximately 1000 gpm to 3000 gpm. The operating RH pump and piping are not subject to gas accumulation under these conditions.

UT examination of portions of the CV piping will be subject to a "go-no go" acceptance criterion. If the line is determined to be water solid, the surveillance requirement will be met. If the UT examination reveals that the line is not water solid, the appropriate equipment will be declared inoperable and associated actions taken.

The design of the CV pumps is such that significant air does not collect in the pumps, whether they are running or not. The suction and discharge lines are on the top of the CV pumps and the internal cavities in the pump are small enough that significant air accumulation in the pump casings would not occur. In addition, there is a mini-flow recirculation line on the discharge side of each CV pump. For the running CV pump, any air in the discharge piping is expected to either recirculate to the VCT suction or stay in solution and pass through the CV injection lines to the reactor vessel.

Even though ComEd considers it highly unlikely that significant air bubbles would exist anywhere in the CV system piping, there is some potential that small amounts of air could accumulate on the upstream side of check valves that protect the standby CV pump from charging header

backpressure. However, as documented in the requests for Operating License Amendments 47 for Byron and 36 for Braidwood, ComEd previously evaluated the consequences of air in the ECCS system piping. The NRC used these arguments as part of the bases for approving the amendment.

ComEd recently reviewed related calculations. A review of the potentially affected piping was performed. The VCT provides the net positive suction head for the CV pumps. The VCT is located at elevation 426 feet. The VCT level is typically maintained between 37% level (approximate elevation 431 feet) and 55% (approximate elevation 433 feet). In addition, the VCT is maintained at a minimum of 15 psig for reactor coolant pump seal backpressure. This is equivalent to 34 feet of water at standard temperature and pressure.

The elevation of the CV pump discharge check valves is at approximately elevation 370 feet. The elevation of the highest point of the discharge piping outside containment is approximately 397 feet. Thus, based on static pressures on the suction side of the CV pumps, air bubbles in the discharge piping of the CV system are unlikely. However, if an air bubble became entrapped in the discharge piping, the discharge piping would be subjected to transient loads during system operation. The air bubble would act as a cushion, traveling along the piping. The air-water interface would impart an impact load in the piping at each change in direction. The affected piping is safety related and is seismically supported.

A review of the RH and SI systems was previously performed to address the potential formation of air bubbles in ECCS piping. Although a static evaluation concluded that the analyzed piping would be water solid, a study was performed to evaluate air bubbles in 2-inch and 8-inch diameter RH piping. The study concluded that the fluid transient loads associated with a water-solid condition in the 2-inch line were small. Reevaluating this line with an air bubble did not increase the fluid transient loads significantly. The 8-inch diameter line experienced considerably larger fluid transient loads. Thus, the 8-inch line was considered the limiting case in this study. An evaluation of the 8-inch line with a 77-foot long air bubble (approx.  $19.5 \text{ ft}^3$ ) concluded that the fluid transient loads were less than the capacities of the supports. An evaluation for a totally voided RH discharge line also yielded fluid transient loads less than the support capacities. The study concluded that the presence of an air bubble would not create a design concern.

The subject CV piping is comprised of 4-inch diameter schedule 160 stainless steel piping. A typical length of piping between the CV pump discharge and the containment isolation valves (SI8801 valves) is 160 feet (approx.  $10.5 \text{ ft}^3$ ). The effects of a bubble in the CV discharge piping are expected to be enveloped by the evaluation of the 8-inch line. The integrity of the 4-inch schedule 160 piping would not be challenged by these loads.

Finally, Byron and Braidwood have performed Ultrasonic Testing (UT) inspections of the CV piping system. Specifically, the piping on the discharge side of the standby CV pump up to the downstream check valves for both units was UT inspected along with the stagnant piping around the SI045 valves. No air voids were identified in either section of piping.

## **G. IMPACT OF THE PROPOSED CHANGE**

The changes proposed in this request will provide continued confidence that unacceptable accumulations of gases will not occur, and will align the surveillance requirements with the design configuration of the ECCS piping. Additionally, it will preclude an obvious safety concern by exempting piping in communication with operating systems from this manual venting.

## **H. SCHEDULE REQUIREMENTS**

ComEd requests that these proposed changes be approved on an exigent basis. Approval of this amendment is necessary to support continued operation of the Byron and Braidwood Units. Byron Units 1 and 2 and Braidwood Unit 2 are currently in Mode 1. As provided in 10CFR 50.91, an exigent situation exists when the licensee and Commission must act quickly and time does not permit the Commission to publish a Federal Register notice allowing 30 days for prior public comment. The circumstances could not have been foreseen and timely application made because Byron and Braidwood Stations considered themselves in compliance with the requirement by crediting the dynamic venting action of the system in operation as meeting the requirement to ensure the ECCS piping is full of water. For the piping not directly in the flowpath, gas accumulation was judged to be not credible due to the pressure prevalent in the piping. The idle centrifugal CV pump was considered to be self-venting due to the system design and piping configuration. It was identified to Byron and Braidwood on May 22, 1997 that this position with respect to meeting the surveillance requirement was not in literal compliance with the Technical Specification wording. As such, the opportunity to make timely application did not exist. ComEd also requests that these changes be made effective immediately upon issuance, as the current surveillances being performed will ensure compliance with the revised requirements.

**ATTACHMENT B-1**

**MARKED UP PAGES FOR  
PROPOSED CHANGES TO APPENDIX A,  
TECHNICAL SPECIFICATIONS, OF  
FACILITY OPERATING LICENSES NPF-37 AND NPF-66**

**BYRON STATION UNIT 1 AND UNIT 2  
REVISED PAGES:**

3/4 5-4  
B 3/4 5-2