



May 23, 1997

U. S. Nuclear Regulatory Commission  
Washington D.C. 20555

Attention: Document Control Desk

Subject: Byron Nuclear Power Station, Units 1 and 2  
Braidwood Nuclear Power Station, Unit 2

Request for Notice of Enforcement Discretion Related to Emergency Core  
Cooling System Venting Surveillance

NRC Docket Nos. 50-454 and 50-455  
NRC Docket No. 50-457

The purpose of this letter is to docket a request by Commonwealth Edison Co. (ComEd) for Enforcement Discretion from NRR from compliance with Technical Specification (TS) 4.5.2.b.1 for Byron Units 1 and 2 and Braidwood Unit 2. Technical Specification 4.5.2.b.1 requires venting of Emergency Core Cooling System (ECCS) pump casings and discharge piping high points outside of containment.

During discussion of a plugged ECCS pump vent line at Byron Unit 2, ComEd became aware that venting practices for discharge piping high points may not reflect literal compliance with TS 4.5.2.b.1. The Chemical and Volume Control (CV) system high point vent is in a section of piping that is pressurized to CV pump discharge pressure and it is not appropriate to routinely open from an equipment reliability and personnel safety standpoint. It was determined that this condition constituted a non-compliance with the surveillance requirements of TS 4.5.2.b.1 at 7:00 PM CDT on May 22, 1997. Both trains of CV were declared inoperable and TS 3.0.3 entered. In accordance with TS 4.0.3, the actions of TS 3.0.3 are being delayed for 24 hours for performance of the missed surveillance.

Enclosure 1 provides the following information necessary for approval of the requested enforcement discretion:

- Description of the requirement for which enforcement discretion is sought,
- Circumstances surrounding the situation, including root causes, the need for prompt action and relevant historical background,
- The safety basis for the request, including an evaluation of the safety significance and potential consequences including risk assessment of the proposed action,

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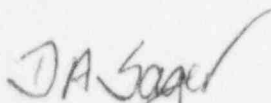
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- Basis for determining that the noncompliance will not be of potential detriment to the public health and safety and that no unreviewed safety question or significant hazard consideration is involved;
- Basis for concluding that the request does not involve adverse consequences to the environment;
- Proposed compensatory actions;
- Justification for the duration of the request;
- Acknowledgement of On-site Review approval;
- Basis for concluding that the NOED criteria of NUREG-1600 are satisfied;
- Marked-up Technical Specification pages;
- Acknowledgement that adoption of line-item improvement or the Improved Technical Specifications would not have obviated the need for the NOED request, and
- Supporting information and references.

Please direct any questions to Marcia Lesniak, Nuclear Licensing Administrator, at (630) 663-6484.

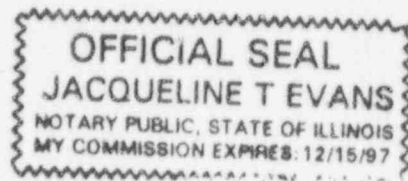
Sincerely,

  
David A. Sager  
Vice President  
Generation Support

Enclosure

cc: A. B. Beach, Regional Administrator - RIII  
S. Burgess, Senior Resident Inspector - Byron  
C. Phillips, Senior Resident Inspector - Braidwood  
G. Dick, Byron Project Manager - NRR  
R. Assa, Braidwood Project Manager - NRR  
Office of Nuclear Safety - IDNS

Signed before me this 23<sup>rd</sup> day,  
of May 1997,  
by Jacqueline T. Evans  
Notary Public



**ENCLOSURE 1**

**BYRON NUCLEAR POWER STATION  
UNITS 1 AND 2**

**BRAIDWOOD NUCLEAR POWER STATION  
UNIT 2**

**WRITTEN REQUEST FOR A  
NOTICE OF ENFORCEMENT DISCRETION**

**FACILITY OPERATING LICENSES  
NPF-37, NPF-66, AND NPF-77**

1. **DESCRIPTION OF THE TECHNICAL SPECIFICATION REQUIREMENT OR LICENSE CONDITION FOR WHICH ENFORCEMENT DISCRETION IS SOUGHT**

Technical Specification (TS) 4.5.2.b.1 requires that the Emergency Core Cooling System (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 Chemical Volume and Control (CV) System 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. Due to this design, no casing vents were provided with the CV pumps. The ECCS discharge piping is provided with vents located at high points throughout the system. Byron Unit 1 is provided with high point vents in the discharge piping both inside and outside containment, while Byron Unit 2 and Braidwood Unit 2 have discharge piping vents outside containment only. The NRC approved a change to require venting of discharge piping high points outside containment only in Operating License Amendment 47 for Byron and Amendment 36 for Braidwood, issued June 22, 1992. ComEd provided justification to demonstrate that venting pump casings and discharge piping high points outside containment was sufficient to prevent water hammer.

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 due to both the suction and discharge piping being 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 to open the valve for routine venting purposes.

Although ComEd considers the CV pumps and piping system to be operable, the question of literal compliance with the surveillance requirement has been raised. Upon determining that the surveillance requirement had not been literally met, both trains of CV were declared inoperable, TS 3.0.3 was entered, and the 24 hour provision for delaying action requirements to allow performance of a missed surveillance, permitted by TS 4.0.3, was entered.

ComEd is requesting that Enforcement Discretion be granted such that the surveillance requirement for venting the CV pump casings and CV discharge piping high points be suspended until an exigent TS change request is submitted and approved by NRR to clarify the ECCS venting requirements.

**2. CIRCUMSTANCES SURROUNDING THE SITUATION, INCLUDING ROOT CAUSES, THE NEED FOR PROMPT ACTION AND RELEVANT HISTORICAL BACKGROUND**

On May 22, 1997, during the discussion of a clogged 2A SI pump vent, the Byron NRC Resident Inspectors raised a concern that the ECCS venting procedure does not include venting the CV pumps and CV discharge line high point. The same procedure is used at Braidwood.

An issue concerning CV pump venting had been raised by a Braidwood engineer in February 1996. The Byron Operability Assessment performed to address the 1996 concern concluded that the pumps are self-venting due to their design and no pump vents are required. Therefore, the TS surveillance requirement was considered to be met.

In further discussions on May 22, 1997, NRC stated its position that a running pump is considered to flush a system, not vent it. The discharge piping downstream of the standby CV pump is not subject to system flow and is therefore not flushed or vented. As such, it was doubtful that Byron and Braidwood were in literal compliance with TS surveillance requirement 4.5.2.b.1.

At 7:00 PM CDT on May 22, 1997, ComEd determined that literal compliance with TS surveillance requirement 4.5.2.b.1 for the CV pumps and high point vent had not been achieved for Byron Units 1 and 2 and Braidwood Unit 2. Both trains of CV were declared inoperable due to the missed surveillance, requiring TS 3.0.3 entry. In accordance with TS 4.0.3, the 24-hour provision for delaying action requirements to permit performance of a missed surveillance, was entered. In addition to pursuing Enforcement Discretion, ComEd performed ultrasonic testing (UT) of the CV high point piping and standby CV pump discharge piping to ensure that the piping does not contain any air pockets which could lead to a water hammer concern.

### 3. EVALUATION OF THE SAFETY SIGNIFICANCE AND POTENTIAL CONSEQUENCES INCLUDING RISK ASSESSMENT OF THE PROPOSED ACTION

ComEd has determined that the requested relief from the surveillance requirements of Technical Specification (TS) 4.5.2.b.1 for Byron Units 1 and 2 and Braidwood Unit 2 has minimal safety significance. This conclusion is supported by previous licensing activities in support of Operating License Amendment 47 for Byron and Amendment 36 for Braidwood. In 1992, NRC approval of this amendment request relieved Byron and Braidwood of the requirement to perform venting operations for ECCS high points inside containment. This amendment request was transmitted in a March 17, 1989 submittal from S. C. Hunsader (ComEd) to T. E. Murley (NRR) and supplemented by ComEd letters dated August 25, 1989, March 12, 1990, and June 10, 1991. In these submittals, ComEd informed the NRC that operational experience at Byron and Braidwood in performing ECCS venting surveillances had identified insignificant quantities of air in the pipes. In addition, ComEd had performed an engineering analysis which demonstrated that in the unlikely event of air voids entering the discharge side of the ECCS pumps, the piping would be capable of withstanding a water hammer event caused by the maximum credible air void in the piping. This engineering analysis, in conjunction with the operating experience at both Byron and Braidwood, provided the technical basis for not venting ECCS piping inside containment. In 1989, after the initial submittal of the amendment requests for Byron and Braidwood, meetings were held at Braidwood Station between ComEd and NRC staff to discuss the bases for the amendment requests. The meetings also provided the NRC staff the opportunity to physically see the ECCS piping applicable to TS 4.5.2. The NRC staff reviewed the technical basis for ComEd's arguments and found the basis acceptable, as documented in the NRC's Environmental Assessment and Finding of No Significant Impact, dated June 4, 1992.

ComEd has determined that similar technical arguments exist for the proposed temporary relief from the surveillance requirements of TS 4.5.2.b.1 for the CV system components. The technical arguments for why water hammer is not a concern for the ECCS system, specifically the discharge piping, are still valid. The original analysis calculated design pipe stresses in representative piping configurations for the ECCS system. These calculations determined that the piping stress loads due to water hammer were a small percentage of the total pipe stress in all of the analyzed cases. ComEd has concluded that the water hammer engineering analysis is applicable to the CV system piping that is the subject of this request.

As stated in the NRC's Safety Evaluation Report for Operating License Amendments 47 and 36 for Byron and Braidwood, respectively, dated June 22, 1992, the intent of the surveillance 4.5.2.b.1 is to demonstrate the operability of the ECCS by verifying that the piping is full of water. The high point vent for the

CV system, outside of containment, is the 1/2SI045 valve. Venting at this valve would meet a portion of the TS surveillance requirement for the CV system. However, this valve is constantly under CV pump discharge pressure of approximately 2500 psia. Therefore, it is not appropriate from a personnel safety or equipment reliability standpoint to routinely vent the CV system at this location. 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 Volume Control Tank (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'. The VCT level is typically maintained between 37% level (approximate elevation 431') and 55% (approximate elevation 433'). 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'. The elevation of the highest point of the discharge piping outside containment is approximately 397'. 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" and 8" diameter RH piping. The study concluded that

the fluid transient loads associated with a water-solid condition in the 2" line were small. Reevaluating this line with an air bubble did not increase the fluid transient loads significantly. The 8" diameter line experienced considerably larger fluid transient loads. Thus, the 8" line was considered the limiting case in this study. An evaluation of the 8" line with a 77-foot long air bubble (approx. 19.5 ft<sup>3</sup>) 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" 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' (approx. 10.5 ft<sup>3</sup>). The effects of a bubble in the CV discharge piping are expected to be enveloped by the evaluation of the 8" line. The integrity of the 4" 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 1/2SI045 valves. No air voids were identified in either section of piping.

In total, the arguments put forth in this section provide strong technical justification that the safety significance for this proposed enforcement discretion is minimal. Although it has been concluded that Byron and Braidwood are not in literal compliance with TS 4.5.2.b.1, there is significant technical justification that the intent of the TS is met for the CV system. In addition, there is no significant increase in consequences in the NRC granting relief to Byron Units 1 and 2 and Braidwood Unit 2. From a risk perspective, this request does not increase the probability of an initiating event that would require the CV system to mitigate the consequences of the event. In addition, ComEd has determined that there is minimal impact of the functional capability of the CV system to perform its intended function of cooling the reactor core and providing shutdown capability following initiation of certain accidents. Therefore, it is judged that the overall increase in risk is negligible.



**4. BASIS FOR DETERMINING THAT THE NONCOMPLIANCE WILL NOT BE OF POTENTIAL DETRIMENT TO THE PUBLIC HEALTH AND SAFETY AND THAT NO UNREVIEWED SAFETY QUESTION OR SIGNIFICANT HAZARD CONSIDERATION IS INVOLVED**

ComEd has also evaluated this request for enforcement discretion and determined that it involves no SIGNIFICANT HAZARD CONSIDERATIONS. An action is determined to involve no significant hazard considerations if:

1. The proposed enforcement discretion does not involve a significant increase in the probability of occurrence or the consequences of an accident previously evaluated.
2. The proposed enforcement discretion does not create the possibility of a new or different kind of accident from any accident previously evaluated.
3. The proposed enforcement discretion does not involve a significant reduction in a margin of safety.

**THE PROPOSED ENFORCEMENT DISCRETION DOES NOT INVOLVE A SIGNIFICANT INCREASE IN THE PROBABILITY OF OCCURRENCE OR THE CONSEQUENCES OF AN ACCIDENT PREVIOUSLY EVALUATED.**

ComEd has determined that the proposed enforcement discretion for relief from the surveillance requirements of TS 4.5.2.b.1 for the CV system for Byron Units 1 and 2 and Braidwood Unit 2 does not represent an increase in the probability or consequences of an accident. This conclusion is justified by the fact that this request does not increase the probability of an accident occurring. In addition, ComEd has determined that the CV system remains fully capable of performing its intended design function, including mitigation of design basis accidents. Although it has been determined that Byron and Braidwood are not in literal compliance with the surveillance requirements in TS 4.5.2.b.1, the functional intent of the surveillance has been met by the inherent design of the CV pumps and the configuration of system piping. This is further supported by the compensatory action which was completed on May 23, 1997 to perform ultrasonic testing inspections of the vulnerable sections of CV system piping for air voids. No air voids were identified. Therefore, since the CV system is expected to function as designed; there would be no increase in consequences from that previously evaluated.

THE PROPOSED ENFORCEMENT DISCRETION DOES NOT CREATE THE POSSIBILITY OF A NEW OR DIFFERENT KIND OF ACCIDENT FROM ANY ACCIDENT PREVIOUSLY EVALUATED.

No new or different accidents are created by the granting of this enforcement discretion. The potential for water hammer in the ECCS system piping has been previously evaluated and found not to be a concern. In addition, ComEd believes that the CV system for Byron Units 1 and 2 and Braidwood Unit 2 will remain free from significant air voids for the duration of the enforcement discretion. Therefore, no new or different accidents from those previously evaluated are created.

THE PROPOSED ENFORCEMENT DISCRETION DOES NOT INVOLVE A SIGNIFICANT REDUCTION IN A MARGIN OF SAFETY.

ComEd has determined that, with the inherent design of the CV system, along with the compensatory action which was completed to UT the vulnerable areas of CV system piping, the CV system meets the intent of TS surveillance requirement 4.5.2.b.1 for ECCS system venting. Therefore, since the system meets the intent of the venting surveillance, it is fully capable of performing its intended design function. No margin of safety would be reduced.

5. **BASIS FOR CONCLUDING THAT THE REQUEST DOES NOT INVOLVE ADVERSE CONSEQUENCES TO THE ENVIRONMENT**

ComEd has evaluated the requested enforcement discretion against the criteria for identification of licensing and regulatory actions requiring environmental assessment in accordance with 10CFR51.21. ComEd has determined that the requested actions meet the criteria for categorical exclusion under 10CFR51.22(c)(9). This determination is based on the fact that the proposed action is being requested as enforcement discretion to a license pursuant to 10CFR50, and that the action involves no significant hazard considerations.

Although the proposed action involves noncompliance with the requirements of TS 4.5.2.b.1,

- (i) The proposed actions involve no significant hazard considerations;
- (ii) There is no significant change in the types or a significant increase in the amounts of any effluent that may be released offsite, since the proposed actions do not affect the generation of any radioactive effluent nor do they affect any of the permitted release paths; and
- (iii) There is no significant increase in individual or cumulative occupational radiation exposure. The actions proposed in this request for enforcement discretion will not significantly affect plant radiation levels, and therefore do not significantly affect dose rates and occupational exposure.

Accordingly, the proposed action meets the eligibility criteria for categorical exclusion set forth in 10CFR51.22(c)(9).

**6. PROPOSED COMPENSATORY ACTIONS**

ComEd has completed a compensatory action to perform an ultrasonic test (UT) inspection of the vulnerable areas in the CV system piping in Byron Units 1 and 2 and Braidwood Unit 2 to verify that the piping is filled with water. Past surveillances have found insignificant gas accumulation or no gas accumulation in stagnant SI and RH lines. Since the CV piping is pressurized during power operations, there is little likelihood of gas accumulation at the high points.

ComEd will perform weekly ultrasonic test inspections of the vulnerable areas in the CV system piping until the NRC approves an amendment to revise the Technical Specification. Additionally, ComEd will provide written information concerning gas accumulation in stagnant lines to licensed operators via a Daily Order. This information will be communicated verbally during shift briefings.

**7. JUSTIFICATION FOR THE DURATION OF THE REQUEST**

This enforcement discretion is being requested until the NRC can approve an exigent Operating License amendment for TS surveillance 4.5.2 b.1. Based on the NRC's schedule for review of the exigent TS amendment, it is not anticipated that this enforcement discretion will be in effect for greater than two weeks from the date of approval (May 23, 1997). As stated in Section 3, there is no significant increase in risk during the period of this enforcement discretion since this request involves a clarification of a surveillance requirement. Therefore, the duration of the enforcement discretion is justified.

**8. ON-SITE REVIEW APPROVAL**

This request has been reviewed and approved by the Onsite Review function at Byron and Braidwood, and authorized by the Site Vice President of each site.

9. **BASIS FOR CONCLUDING THAT THE NOED CRITERIA OF NUREG-1600 ARE SATISFIED**

ComEd has evaluated the requested enforcement discretion against the criteria specified in NUREG-1600. It has been determined that the requested actions meet the NOED criteria for an operating plant. This determination is based on avoidance of an undesirable transient caused by the shutdown of the reactor [undesirable condition] as a result of forcing compliance with the Technical Specifications and, thus, minimizes potential safety consequences and operational risks associated with a plant shutdown.

Routine venting at the high point vent for the CV system, outside of containment, at valve 1/2SI045 is not appropriate from a personnel safety or equipment reliability standpoint, since it is constantly under CV pump discharge pressure of approximately 2500 psia.

**10. MARKED-UP TECHNICAL SPECIFICATION PAGES IDENTIFYING PROPOSED CHANGES**

The proposed marked-up TS pages to clarify the ECCS venting requirements are attached. The TS change request package to support these changes will be submitted May 23, 1997.