



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 104 TO FACILITY OPERATING LICENSE NO. NPF-37,
AMENDMENT NO. 104 TO FACILITY OPERATING LICENSE NO. NPF-66,
AMENDMENT NO. 96 TO FACILITY OPERATING LICENSE NO. NPF-72,
AND AMENDMENT NO. 96 TO FACILITY OPERATING LICENSE NO. NPF-77
COMMONWEALTH EDISON COMPANY
BYRON STATION, UNIT NOS. 1 AND 2
BRAIDWOOD STATION, UNIT NOS. 1 AND 2
DOCKET NOS. STN 50-454, STN 50-455, STN 50-456 AND STN 50-457

1.0 INTRODUCTION

By letter dated December 30, 1997, Commonwealth Edison Company (ComEd, or the licensee) proposed changes to the current Technical Specifications (TS) and the proposed improved Technical Specifications (ITS) for the Byron Station, Unit Nos. 1 and 2, and Braidwood Station, Unit Nos. 1 and 2. The proposed changes would revise TS 3.7.1.3 (ITS 3.7.6), "Condensate Storage Tank," and its associated bases to raise the minimum required condensate storage tank (CST) level. The licensee also proposed to revise the auxiliary feedwater (AFW) pump suction pressure-low trip setpoint in TS Table 3.3-4, "Engineered Safety Features Actuation System Instrumentation Trip Setpoints" (ITS Table 3.3.2-1, "Engineered Safety Features Actuation System Instrumentation"). The AFW pump low-pressure trip automatically transfers the AFW pumps' suction from the CST to the essential service water (SX) system. The proposed change is intended to ensure that the design basis requirements for the AFW system are accurately reflected in the TSs. The Byron and Braidwood units are currently operating with conservative administrative limits for minimum CST level.

The licensee proposed to increase the minimum required CST level from 40 percent to 75 percent for Byron, Units 1 and 2, from 40 percent to 80 percent for Braidwood, Unit 1, and from 40 percent to 66 percent for Braidwood, Unit 2. After a modification is installed on the AFW suction pressure instrumentation, a minimum required level of 60 percent will be required for Byron, Units 1 and 2, and a level of 57 percent will be required for Braidwood, Unit 2. The minimum required level of 57 percent will also apply to Braidwood, Unit 1, after the instrumentation modification is complete following additional modifications to increase the Unit 1 CST height.

Additionally, the licensee proposed to change the AFW pump low-pressure trip setpoint from 1.22 inches of Mercury vacuum (1.22" Hg) to ≥ 18.1 pounds per square inch absolute (psia) and change the allowable value from 2" Hg to ≥ 17.4 psia. The current 1.22" Hg and 2" Hg values are equivalent to 14.1 psia and 13.7 psia, respectively. Thus, the proposed change results in

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increases in the trip setpoint and corresponding allowable value. There is no upper limit for the setpoint since the safety-related source of AFW is the SX system and an earlier than required transfer is within the design basis.

2.0 BACKGROUND

The AFW system supplies cooling water to the steam generators upon loss of main feedwater supply. The AFW system employs a motor-driven (MD) pump and a diesel-driven (DD) pump. Normally, both the MDAFW pump and the DDAFW pump take suction from the CST. When the CST is unavailable, both pumps take suction from the SX system. Switchover from the CST to the SX system is designed to occur automatically on low pressure in the AFW pump suction line coupled with an auto-start of the AFW system.

In 1994, the licensee identified operability concerns involving the postulated failure of the non-seismic-related CST piping in the turbine building during a seismic event. The postulated failure of the non-seismic piping could possibly result in atmospheric pressure in the AFW pump suction line. With the previous setpoint of 1.22" Hg (14.1 psia) for the automatic switchover, a failure of the non-seismic piping could result in not reaching the switchover setpoint because the resultant atmospheric pressure (14.7 psia) was higher than the trip setpoint. As a result of this determination, the licensee administratively increased the minimum CST levels (for each unit) to 75 percent at Byron and 80 percent at Braidwood. The minimum administrative limit at Braidwood, Unit 2, was later changed to 66 percent after the physical height of the tank was raised. The AFW pump switchover trip setpoint was also raised from 14.1 to 18.1 psia and the low pressure alarm setpoint was raised from 16.1 to 20.1 psia. A low pressure AFW pump trip, designed to protect the pumps from loss of suction, was likewise raised from 12.5 psia to 16.5 psia.

3.0 EVALUATION

The operability of the CST with the current TS minimum water level of 40 percent is intended (TS design basis) to ensure that sufficient water (200,000 gallons) is available to maintain the reactor control system (RCS) at hot standby conditions for at least 9 hours with steam discharge to the atmosphere concurrent with total loss-of-offsite power.

In December 1997, the licensee performed a design calculation to determine the minimum required volume of water in the CST to meet the design and licensing basis requirements (200,000 gallons available to AFW). This calculation accounted for design issues including instrument uncertainty, replacement steam generators at Byron, Unit 1, and Braidwood, Unit 1, and factors affecting the volume of useable water in the CST. The calculation also involved determining the amount of water required to minimize the potential for an inadvertent switchover of the AFW pump suction from the CST to the SX system. The automatic switchover is designed to occur under emergency conditions if the CST becomes unavailable (e.g., due a seismic event or a tornado).

After the operability concern from 1994 was addressed, a modification was designed to the AFW suction pressure instrumentation to filter the pressure spike signal that occurs during the startup of a MDAFW pump. This modification will help reduce the potential for an inadvertent switchover of the AFW supply from the CST to the SX system. Therefore, the proposed TS minimum level also decreases from the original administrative limit after the modification is installed.

The proposed minimum CST level reflects a conservative value that bounds the TS basis requirements for the CST. The new analysis considered the licensing basis requirements for the AFW system along with the physical characteristics of the CSTs and associated piping. For example, the suction pressure transient and fluid vortexing in the CSTs following AFW pump actuation were taken into consideration and conservatively modeled in the analysis. In addition, conservative level instrumentation uncertainties were calculated, and finally, a reconstitution of the AFW requirements for cooldown and the impact of replacement steam generators were calculated. The proposed changes are intended to ensure that all of the design considerations have been addressed.

The proposed minimum CST level reflects a conservative value that bounds the TS basis requirements for the CST. The level also ensures that sufficient water is available in the CST to minimize the potential for an inadvertent switchover to the SX system under emergency conditions, unless that switchover is required due to the unavailability of the CSTs. The revised levels also ensure that all accident analysis assumptions are met.

Based on the conservatism in the licensee's analysis and the fact that the proposed changes in the required minimum volume are conservative in nature (i.e., higher than the existing minimum required level) the staff concludes that the proposed changes to TS 3.7.1.3 (ITS 3.7.6) are acceptable. The licensee's proposed Bases for these TSs have also been reviewed by the staff, and the staff concluded that they adequately reflect the design requirements for the CST inventory.

The proposed changes to TS Table 3.3-4 (ITS Table 3.3.2-1) are intended to reflect the current design values for the AFW suction transfer trip setpoint and the design basis of the AFW system. These proposed changes are also conservative in nature since they provide added assurance that the switchover to the SX system will occur in accordance with the design basis. Based on the conservative nature of the proposed changes which increase the switchover setpoint, the staff concludes that these changes are also acceptable.

4.0 SUMMARY

Based on its review, the staff concludes that the proposed changes are necessary in order for the TS requirements to be consistent with the design basis of the AFW system including General Design Criterion (GDC) 2, "Design Basis for Protection Against Natural Phenomena," and GDC 34, "Residual Heat Removal." The staff has further concluded that the changes are more conservative than the existing TS requirements and are consistent with the accident analysis of those events that assume a minimum volume of water in the CST. The proposed changes also provide added assurance that the automatic suction switchover will function as designed upon loss of the CST while minimizing the potential for inadvertent switchover. The staff has, therefore, concluded that the proposed changes are acceptable.

5.0 STATE CONSULTATION

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

6.0 ENVIRONMENTAL CONSIDERATION

The amendments change 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 amendments involve 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 previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (63 FR 9596). Accordingly, the amendments meet 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 amendments.

7.0 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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

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Date: October 6, 1998