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ComEd

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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

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

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

Braidwood Station Units 1 and 2
Facility Operating Licenses NPF-72 and NPF-77
NRC Docket Nos. 50-456 and 50-457

"Condensate Storage Tank (CST) Level"

Pursuant to 10 CFR 50.90, Commonwealth Edison (ComEd) proposes to amend Appendix A, Technical Specifications, of Facility Operating Licenses NPF-37, NPF-66, NPF-72, and NPF-77. ComEd proposes to revise Technical Specification 3.7.1.3, "Condensate Storage Tank," and its associated Bases for Byron and Braidwood to raise the minimum allowable CST level. The proposed change ensures that a sufficient volume of water is available to meet the design basis requirements for the auxiliary feedwater (AF) system supply. ComEd also proposes to revise the AF system transfer to essential service water (SX) trip setpoint and allowable value in Table 3.3-4, functional unit 6.g, to ensure that the design basis requirements for the AF system are accurately reflected in the Technical Specifications.

Both Byron and Braidwood Stations are currently operating with conservative administrative limits for minimum CST level. These administrative limits provide sufficient operating margin to ensure that the current design basis requirements for the AF system are met.

In October 1997, the NRC issued a Notice of Violation (NOV), as documented in Byron Inspection Report 97-015, for failure to take timely corrective action in not submitting a license amendment request to reflect the changes made to the minimum CST level in 1994. In response to that NOV, Byron made a commitment to the NRC to submit a license amendment request to revise the minimum CST level in TS 3.7.1.3 and change the AF suction CST to SX trip setpoint in TS Table 3.3-4. This submittal reflects completion of that commitment.

This proposed amendment request is subdivided as follows:

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1. Attachment A gives a description and safety analysis of the proposed changes in this amendment.

2. Attachment B includes the marked up Technical Specification pages for both the current Byron and Braidwood Technical Specifications (CTS) and the Byron and Braidwood Improved Technical Specifications (ITS) with requested changes indicated.

3. Attachment C describes ComEd's evaluation performed in accordance with 10 CFR 50.92(c), which confirms that no significant hazards consideration is involved.

4. Attachment D provides the Environmental Assessment.

This proposed amendment has been reviewed and approved by ComEd Onsite and Offsite Review in accordance with ComEd procedures.

ComEd is notifying the State of Illinois of this application for amendment by transmitting a copy of this letter and its attachments to the designated state official.

I affirm that the content of this transmittal is true and correct to the best of my knowledge, information and belief

Please address any comments or questions regarding this matter to this office.

Sincerely,

K. L. Graesser

K. L. Graesser
Site Vice President
Byron Nuclear Power Station

Subscribed and sworn to before me, a Notary Public, this 30th day of Dec., 1997

OFFICIAL SEAL
Tracey Fluck
Notary Public State of Illinois
My Commission Expires 1-13-00

Tracey Fluck
Notary Public

KLG/LL

Attachments

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

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ATTACHMENT A

DESCRIPTION AND SAFETY ANALYSIS FOR THE PROPOSED CHANGES

A. SUMMARY OF PROPOSED CHANGES

Pursuant to 10 CFR 50.90, Commonwealth Edison (ComEd) proposes to amend Appendix A, Technical Specifications (TS), of Facility Operating Licenses NPF-37, NPF-66, NPF-72, and NPF-77. Note that in the text of this submittal, the current Technical Specification (CTS) changes will be noted first, and the corresponding proposed Improved Technical Specification (ITS) changes will be noted in { }. ComEd proposes to revise Byron and Braidwood TS section 3.7.1.3 {3.7.6}, "Condensate Storage Tank" and the associated Bases to increase the minimum condensate storage tank (CST) water level to ensure that the design basis requirements for the auxiliary feedwater (AF) system are met.

ComEd proposes to increase the minimum value from 40% to 75% for Byron Units 1 and 2, from 40% to 80% for Braidwood Unit 1, and from 40% to 66% for Braidwood Unit 2. After a modification is installed on the AF suction pressure instrumentation, a minimum water level of 60% will be required for Byron Units 1 and 2 and a level of 57% will be required for Braidwood Unit 2. The 57% requirement will apply to Braidwood Unit 1 after the AF instrumentation modification is complete, along with a modification to increase the CST height. Additionally, ComEd proposes to revise the AF pump suction pressure-low trip setpoint and the allowable value in Table 3.3-4 {3.3.2-1}, functional unit 6.g {6.f.} to reflect the design basis requirements of the AF system.

The proposed TS changes are described in detail in Section E of this attachment. Marked up pages are provided in Attachments B-1 and B-2 for Byron and Braidwood, respectively. In Reference 1, ComEd submitted an application for conversion to the Improved Standard Technical Specifications. Corresponding changes are also provided on the proposed ITS pages in Attachments B-1a and B-2a for Byron and Braidwood, respectively.

B. DESCRIPTION OF THE CURRENT REQUIREMENTS

TS 3.7.1.3 {3.7.6} requires that the CST have a contained water level of at least 40% in Modes 1, 2, and 3. Table 3.3-4 {3.3.2-1}, functional unit 6.g. {6.f.} lists the AF pump suction pressure-low (transfer to SX) trip setpoint and allowable value. The trip setpoint value is 1.22" Hg vacuum, which corresponds to 14.1 psia. The allowable value is 2" Hg vacuum, which corresponds to 13.7 psia.

C. BASES FOR THE CURRENT REQUIREMENTS

The operability of the CST with the minimum water level of 40% ensures that sufficient water (200,000 gallons) is available to maintain the reactor coolant system (RCS) at hot standby conditions for nine hours with steam discharge to the atmosphere concurrent with total loss-of-offsite power.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

Subsection 10.4.9.1 of the UFSAR identifies the design basis of the AF system. The function of the AF system is to provide adequate cooling water to the steam generators in the event of a loss-of-offsite power coupled with various other accidents discussed in section 15.2.7 of the UFSAR. The AF system is designed to provide enough feedwater to cool the unit down safely to the temperature at which the residual heat removal system can be used. The total amount of feedwater required to replace steam vented to the atmosphere and to compensate for shrinkage during cooldown is 200,000 gallons for four steam generators. The original design analysis that supports the 200,000-gallon requirement is documented in Reference 2.

Although the preferred source of water to the suction of the AF system comes from the Safety Category II CSTs, the UFSAR clearly indicates that the AF system is supplied with water from the Safety Category I SX system under emergency conditions. Switchover from the CST to the SX water supply is accomplished automatically on a low pressure in the suction line to the AF pump coupled with an autostart of the AF system.

D. NEED FOR REVISION OF THE REQUIREMENT

ComEd is submitting this amendment request to ensure that the TS requirement for minimum CST level reflects the current design basis requirements and the design of replacement steam generators for Byron Unit 1 and Braidwood Unit 1.

In 1994, ComEd identified an operability concern involving the postulated failure of Safety Category II CST piping in the turbine building during a seismic event. This postulated failure of the non-seismic piping could eventually result in atmospheric pressure (14.7 psia) in the AF suction line. This would minimize the potential for an automatic switchover of the AF water supply from the CST to SX water, since the previous trip setpoint value was 14.1 psia or 1.22" vacuum. In response to the operability concern, the minimum administrative CST levels were increased to 75% at Byron and 80% at Braidwood. The minimum administrative CST level for Braidwood Unit 2 was later changed to 66% after the physical CST height was raised. Additionally, the AF pump trip setpoint was raised from 12.5 psia to 16.5 psia; the AF suction CST to SX switchover setpoint was raised from 14.1 psia to 18.1 psia, and the AF low suction pressure alarm setpoint was raised from 16.1 psia to 20.1 psia. Each of these three setpoints was raised by four psia to maintain the same relative difference between the setpoints. These actions ensured that the automatic switchover of the AF water supply would occur when required.

ComEd believed that these changes were conservative with respect to the current TS values, and Byron and Braidwood continue to operate with the revised setpoints and CST levels. However, in October 1997, the NRC issued a Notice of Violation (NOV), as documented in Byron Inspection Report 97-015, for failure to take timely corrective action in not submitting a license amendment request to reflect the changes made in 1994. In response to that NOV, Byron made a commitment to the NRC to submit a license amendment request to revise the minimum CST level in TS 3.7.1.3 {3.7.6} and change the AF suction CST to SX trip setpoint in TS Table 3.3-4 {3.3.2-1}. This submittal reflects completion of that commitment.

In Reference 8, ComEd performed a design calculation to determine the minimum required volume of water in the CST to meet the design and licensing basis requirements. This comprehensive 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 from AF supply from the CST to SX. An inadvertent switchover occurs when the SX is used when the CST is still available. The CST contains demineralized water; the SX system normally contains river water. Introducing river water could lead to degradation in the secondary systems. Therefore, sufficient water is currently maintained in the CSTs to meet the TS Bases requirement in addition to minimizing the potential for a switchover of the AF water supply from the CST to SX, unless required. The switchover from the CST to SX would still occur under emergency conditions if the CST were unavailable (e.g., seismic event, tornado).

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

E. DESCRIPTION OF THE PROPOSED CHANGES

ComEd proposes to change TS 3.7.1.3 {3.7.6} and associated Bases. ComEd proposes to revise this minimum value for CST operability from 40% to 75% at Byron Units 1 and 2, from 40% to 80% at Braidwood Unit 1, and from 40% to 66% at Braidwood Unit 2. The proposed minimum value is 60% at Byron and 57% at Braidwood Unit 2 following scheduled modifications on each unit for the AF suction pressure circuitry. For Braidwood Unit 1, the minimum level will be 66% following the modification to raise the CST, and then will be reduced to 57% after the AF instrumentation modification. The values are clarified by footnotes that explain which value is in effect. The minimum values are tied to fuel cycles that correspond to the modification schedules.

In addition, ComEd proposes to change the Bases for TS 3.7.1.3 {B3.7.6} to state that the minimum water level in the CST meets the current licensing basis and ensures that an inadvertent switchover of the AF water supply from the CST to the SX system does not occur. The switchover would still occur under emergency conditions, as required, if the CST were unavailable. The proposed Bases delineate the requirements for CST inventory along with a discussion of the assumptions that were used to determine the minimum requirements.

Finally, ComEd proposes to change TS Table 3.3-4 {3.3.2-1}, functional unit 6.g. {6.f.} to reflect the current design AF suction transfer trip setpoint and allowable value. The trip setpoint value in TS Table 3.3-4 will be revised from 1.22" Hg vacuum (14.1 psia) to $\geq$ 18.1 psia; the allowable value in Table 3.3-4 {3.3.2-1} will be revised from 2" Hg vacuum (13.7 psia) to $\geq$ 17.4 psia.

F. SAFETY ANALYSIS OF THE PROPOSED CHANGES

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

Per Reference 2, the amount of water required to maintain a unit in hot standby ($\geq$ 350°F, Mode 3) for nine hours following a reactor trip with a coincident loss-of-offsite power is 179,427 gallons. This value was calculated by Westinghouse assuming a total RCS volume associated with the original steam generators (SGs).

The original SGs are being replaced at Byron Unit 1 and Braidwood Unit 1. The replacement SGs have a larger primary side volume, and operate at a higher secondary side pressure, saturation temperature, and stored energy mass. Consequently, the AF volume required to meet the design basis for Unit 1 is larger than that required for the original SGs. ComEd has conservatively determined that a maximum 2692 additional gallons (Reference 7) of water is required for AF supply due the replacement SGs. Therefore, the total amount of useable water required to maintain a unit in hot standby conditions for nine hours with a total loss-of-offsite-power is 182,119 gallons. Note that the amount of water reported here does not consider the physical configuration of the CST or associated piping. The proposed changes to CST level bound this calculation.

UFSAR Subsection 10.4.9.1, "Auxiliary Feedwater System Design Basis," describes an additional requirement for feedwater supply to the AF system. Specifically, the function of the AF system is to provide adequate cooling water to the SGs in the event of a loss-of-offsite power coupled with various occurrences as discussed in Subsection 15.2.7 (Loss of Normal Feedwater Flow). With either AF pump supplying the four SGs, enough feedwater is provided to cool the unit down safely to the temperature at which the residual heat removal system can be used. The total amount of feedwater required to replace steam vented to the atmosphere and to compensate for shrinkage during cooldown is 200,000 gallons for four SGs.

The UFSAR further indicates that the SX system is the emergency source of water to the AF system. The requirement of 200,000 gallons of available water is currently reflected in the design basis analyses for the SX system and ultimate heat sink. ComEd has verified that, with the replacement steam generators, 200,000 gallons of useable water is sufficient to meet this requirement. Reference 6 includes the analysis that supports the 200,000-gallon requirement. The proposed changes to CST level do not affect the capability of the SX system to supply the required volume of water to the AF system.

Maintaining 200,000 useable gallons of water in the CST, in addition to maintaining sufficient static head level in the CST, provides high confidence that switchover of the AF supply to SX will not occur, except under emergency circumstances where the CST is unavailable (e.g., seismic event or tornado). Therefore, the analysis that was performed to determine the minimum acceptable CST level considered both the requirement to maintain 200,000 gallons of useable water in the CST and the requirement to maintain sufficient static head in the CST to minimize the potential for an inadvertent switchover.

Minimizing the potential for inadvertent switchovers ensures the long-term availability and reliability of the steam generators. This is because the SX system water introduces impurities that can eventually degrade the SGs. The usual source of SX system water is the river water, which has relatively high concentrations of dissolved minerals and sediment compared to the CST water, which is demineralized. The SX system provides the safety-related source of water under emergency conditions; the CSTs are non-safety related.

The analysis to determine the revised TS minimum CST tank level considered the licensing basis requirements for the AF 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 AF pump actuation was conservatively modeled in References 3 and 4, respectively. In addition, conservative CST level instrument uncertainties were calculated in Reference 5. Finally, a reconstitution of the AF system requirements for cooldown and the impact of the replacement SGs was calculated in References 6 and 7, respectively. Collectively, all of the supporting calculations and documents in References 2 through 7 provided input into the minimum CST level determination, which is documented in Reference 8. The proposed changes ensure all of the design considerations have been addressed. All of the calculations that support the proposed TS minimum CST levels were prepared and/or reviewed and approved per the ComEd Quality Assurance Standards.

The values for TS Table 3.3-4 {3.3.2-1}, Functional Unit 6.g. {6.f.} are revised to reflect the current design AF suction transfer trip setpoint values. The proposed changes to Table 3.3-4 {3.3.2-1} ensure that the TS accurately reflect the design basis of the AF system. As documented in Reference 9, the current AF suction transfer switchover setpoint of 18.1 psia has been conservatively determined to meet the design basis for the AF system. The setpoint of 18.1 psia and the TS allowable value of 17.4 psia were calculated assuming the postulated failure of the CST and/or associated piping, thereby potentially exposing the AF suction to atmospheric pressure (14.7 psia). Note that ComEd is converting the measurements from inches of mercury to absolute pressure (psia). Both values are provided above for comparison; however, the calculation is performed using psia. Additionally, the original table did not clearly indicate that the values were minimum values. The "≥" symbol has been added for clarity. The revised values ensure that switchover from the CST to SX water supply will occur under emergency conditions when the CST water supply becomes unavailable (e.g., due to a seismic event or a tornado). Appropriate instrument uncertainties are considered in the revised values. The current design basis for the SX system ensures that sufficient water is available to supply the AF system under emergency conditions.

ComEd plans to install a modification to the AF suction pressure instrumentation to filter the pressure spike signal that occurs during the startup of an AF pump. The modification will help reduce the potential of an inadvertent switchover from the CST to SX that would result when the pressure spike momentarily falls below the switchover setpoint. By filtering the signal temporarily, the switchover would occur only when required. Before the modification is installed, a CST level of 75% at Byron Units 1 and 2, 80% at Braidwood Unit 1, and 66% at Braidwood Unit 2 ensures that the switchover setpoint will not be reached. After the modification, only a 60% level will be required at Byron and 57% level will be required for Braidwood Unit 2. Braidwood Unit 1 will require two modifications. First, the CST will be raised ten feet. This decreases the level requirement to 66% (The Braidwood Unit 2 CST has already been raised). After that, the AF instrumentation will be modified, decreasing the level requirement to 57%. These values were