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RS-21-057

10 CFR 50.90

May 27, 2021

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Braidwood Station, Units 1 and 2
Renewed Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456 and STN 50-457

Subject: License Amendment to Braidwood Station, Units 1 and 2, Technical Specification 3.7.9, "Ultimate Heat Sink"

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," Exelon Generation Company, LLC (EGC), is submitting a request for amendment to Renewed Facility Operating License Nos. NPF-72 and NPF-77 for Braidwood Station, Units 1 and 2 (Braidwood).

The proposed amendment is to change Technical Specifications (TS) Surveillance Requirement (SR) 3.7.9.2 to allow an Ultimate Heat Sink (UHS) temperature of ≤ 102.8°F until September 30, 2021.

Historical meteorological and atmospheric conditions have resulted in the TS UHS temperature being challenged. These conditions include elevated air temperatures, high humidity, and low wind speed. Specifically, the summer of 2020 brought hot weather and drought conditions to the northern Illinois area resulting in sustained elevated UHS temperatures, leading to this license amendment request (LAR) to change the UHS temperature limit until September 30, 2021. EGC is currently developing a LAR for a long term solution to address UHS temperature challenges. However, the LAR will not be completed in time to address potential UHS temperature impacts during Summer 2021 operation.

As described in Regulatory Guide (RG) 1.27, Revision 2, "Ultimate Heat Sink for Nuclear Power Plants," the predicted response of the UHS temperature to the design basis event is a function of the historical weather including the diurnal variations. This LAR is consistent with Braidwood Station's licensing basis (i.e., RG 1.27 Revision 2). The purpose of the UHS TS temperature limit is to restrict the initial UHS temperature such that the maximum UHS temperature (i.e., the temperature of the cooling water supplied to the plant safety systems from the UHS) experienced during the UHS design basis event would not exceed the design limit of the plant equipment cooled by the UHS.

The attached amendment request is subdivided as follows:

- Attachment 1 provides an evaluation of the proposed change.

- Attachment 2 provides the current TS pages with the proposed change indicated with markups.
- Attachment 3 revised (Clean) TS page
- Attachment 4 provides Mark-up TS Bases pages. The TS bases pages are provided for information only and do not require NRC approval.

In accordance with 10 CFR 50.91, "Notice for public comment; State consultation," paragraph (b), EGC is notifying the State of Illinois of this application for license amendment by transmitting a copy of this letter and its attachments to the designated State Official.

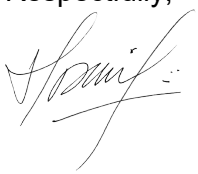
EGC requests approval of the proposed license amendment by July 12, 2021 to support plant operation during northern Illinois' summer hot weather and drought conditions resulting in sustained elevated UHS temperatures. Once approved, the amendment will be implemented within 5 days.

The proposed amendment has been reviewed and approved by the Braidwood Station Plant Operations Review Committee in accordance with the requirements of the EGC Quality Assurance Program.

There are no regulatory commitments contained in this letter. Should you have any questions concerning this letter, please contact Mr. Phillip A. Henderson at (630) 657-4727.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 27th day of May 2021.

Respectfully,



Dwi Murray
Sr. Manager – Licensing
Exelon Generation Company, LLC

Attachments:
1. Evaluation of Proposed Change
2. Mark-up of Proposed Technical Specification Page Change
3. Revised (Clean) Technical Specifications Page
4. Mark-up of Technical Specification Bases Pages – For Information Only

cc:
NRC Regional Administrator – Region III
NRC Senior Resident Inspector – Braidwood Station
Illinois Emergency Management Agency – Division of Nuclear Safety

ATTACHMENT 1
Evaluation of Proposed Changes

Subject: License Amendment to Braidwood Station, Units 1 and 2, Technical Specification 3.7.9, "Ultimate Heat Sink"

ATTACHMENT 1
Evaluation of Proposed Changes

1.0 SUMMARY DESCRIPTION

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," Exelon Generation Company, LLC (EGC), is submitting a request for amendment to Renewed Facility Operating License Nos. NPF-72 and NPF-77 for Braidwood Station, Units 1 and 2 (Braidwood).

The proposed amendment is to change Technical Specifications (TS) Surveillance Requirement (SR) 3.7.9.2 to allow an Ultimate Heat Sink (UHS) temperature of ≤ 102.8°F until September 30, 2021.

Historical summer meteorological and atmospheric conditions have resulted in the TS UHS temperature limit being challenged. These conditions include elevated air temperatures, high humidity, and low wind speed. Specifically, July 4 through July 9, 2020 brought hot weather and drought conditions to the northern Illinois area resulting in sustained elevated UHS temperatures. The UHS design analysis methodology is based on Regulatory Guide (RG) 1.27, Revision 2, "Ultimate Heat Sink for Nuclear Power Plants," and NUREG-0693, "Analysis of Ultimate Heat Sink Cooling Ponds," dated November 1980.

This license amendment is being sought to allow the TS temperature limit of the cooling water supplied to the plant from the UHS to increase from ≤ 102°F to ≤ 102.8°F. The impact of the maximum UHS temperature experienced during a Design Basis Accident (DBA) event has been evaluated consistent with the Braidwood Station current licensing basis. This includes Regulatory Position C.1.b of RG 1.27, Revision 2 which states that the UHS temperature transient analysis should include diurnal variations for the total of the critical time period, based on examination of regional climatological measurements that are demonstrated to be representative of the site. While the analysis has been performed to analyze the diurnal variations, the proposed TS limit for the UHS temperature is proposed to increase from ≤ 102°F to ≤ 102.8°F, independent of time of day. This is consistent with the existing TS.

The evaluations and analyses that support this proposed license amendment demonstrate that the plant's safety related equipment will maintain its design function at the higher UHS temperature. Therefore, the proposed change has no adverse impact on Braidwood Station plant safety.

This license amendment to change the UHS temperature limit is being requested until September 30, 2021. EGC is developing a license amendment request (LAR) for a long term solution to address UHS temperature challenges. However, the LAR will not be completed in time to address potential UHS temperature impacts during Summer 2021 operation. Therefore, this UHS temperature limit proposed change is requested to cover a limited period of time until September 30, 2021. EGC plans to submit a subsequent license amendment request and associated technical justification to permanently revise TS 3.7.9, "Ultimate Heat Sink."

2.0 DETAILED DESCRIPTION

2.1 Proposed Changes

The proposed change to TS 3.7.9 is shown in Attachment 2 and is as follows:

The current TS SR 3.7.9.2 states:

> Verify average water temperature of UHS is ≤ 102.8°F until September 30, 2020. After September 30, 2020, verify average water temperature of UHS is ≤ 102°F.

The proposed TS SR 3.7.9.2 states:

> Verify average water temperature of UHS is ≤ 102.8°F until September 30, 2021. After September 30, 2021, verify average water temperature of UHS is ≤ 102°F.

2.2 Background

The UHS consists of an excavated essential cooling pond integral with the main cooling pond. The volume of the UHS is sized to permit the safe shutdown and cooldown of both Braidwood Station units for a minimum 30-day period during a DBA with no additional makeup water source. The UHS is designed to withstand the separate occurrence of either the safe shutdown earthquake or the probable maximum flood on the cooling pond. The UHS provides a heat sink for process and operating heat from safety related components during a transient or accident, as well as during normal operation. The UHS dissipates residual heat after reactor shutdown and after an accident through the cooling components of the Essential Service Water (SX) System and the Component Cooling Water (CC) system, which are the principal systems at Braidwood Station that utilize the UHS to dissipate residual heat. The UHS also provides a source of emergency makeup water for the spent fuel pool and can provide water for fire protection equipment. Non-Essential Service Water (WS) pumps and Circulating Water (CW) pumps also take suction from the UHS during normal operation, however, operation for post-accident conditions is not considered since the WS and CW pumps are shut down before the UHS level reaches the minimum required water level for plant operation at 590 feet.

The SX system takes suction from intake lines running from Safety Category I essential cooling pond to the auxiliary building where four SX pumps (two per unit) supply safety-related loads and components essential to safe shutdown. These include cubicle coolers, pump coolers, diesel engine coolers, CC heat exchangers, Reactor Containment Fan Coolers (RCFC) and chiller condensers. The CC system provides cooling water to the residual heat removal system, chemical and volume control system, reactor coolant system and process sampling system. Updated Final Safety Analysis Report (UFSAR) Figure 2.4-47, "Essential Cooling Pond," shows the layout of the SX supply and discharge piping along with the Circulating Water supply and discharge piping. Relevant elevations for the cooling pond are also included in this figure.

The Braidwood limiting UHS DBA (i.e., that event that results in the maximum heat load on the UHS) is one unit undergoing post-Loss of Coolant Accident (LOCA) cooldown concurrent with a Loss of Offsite Power (LOOP), in conjunction with the other unaffected unit undergoing a safe non-accident shutdown. This scenario assumes the worst case single failure of the manmade structure (i.e., the Category II retaining dikes) that encloses the main cooling pond. This limiting DBA includes three sources of heat energy to be transferred by the SX system after a LOCA: containment heat removal via the RCFCs, containment heat and reactor residual heat removal from the containment sumps via the residual heat removal and component cooling system , and Engineered Safety Features (ESF) equipment heat loads (e.g., ESF equipment coolers and room coolers) and the Main Control Room chiller.

The thermal performance of the Braidwood Station UHS was originally developed based on the initial UHS temperature of 98°F and meteorological conditions from the summer of 1955 for highest temperature and summer of 1971 for highest evaporation. On June 13, 2000, the U.S. NRC issued an amendment to increase the allowable UHS temperature from 98°F to 100°F. Due to changes in meteorological conditions that resulted in the TS UHS temperature limit being challenged in 2012, EGC submitted a subsequent license amendment to increase the UHS allowable temperature to 102°F. On July 26, 2016, the U.S. NRC approved the increase of allowable TS UHS temperature from 100°F to 102°F.

The analysis of the Braidwood Station UHS to determine the TS limit for TS amendment 189 (ML16133A438) and the associated post-DBA UHS temperature was a multi-step process. The steps included determining the critical time periods unique to the Braidwood Station UHS, gathering updated meteorological data, and screening the meteorological data to determine the most limiting sets of data. This information was used in the UHS analysis to determine UHS temperature and evaporation response by analyzing the combined effects of the most limiting sets of meteorological data with the DBA heat loads. Once the limiting post-DBA UHS temperature responses were determined, they were used (1) as input into the safety analysis to ensure responses remained within analyzed limits and (2) to evaluate performance margins of equipment cooled by the SX and CC systems. The evaporation response was assessed against the existing design analysis to ensure response remained within limits.

As described in Reference 6, the average water temperature of the UHS is measured at the discharge of the running SX pumps on Units 1 and 2. The surveillance procedures require that if the temperature of any operating SX pump is ≥ 99°F, a precision temperature instrument, procured for this application, be used to verify the temperature. Instrument uncertainty has been considered in the surveillance procedures and the higher accuracy thermometer is used when temperatures are ≥ 99°F. The difference (3°F) between 99°F and the current TS SR 3.7.9.2 limit of ≤ 102°F is equal to the maximum calculated instrument uncertainties associated with the installed instrumentation. The calculated uncertainty of this precision thermometer is 0.07°F. This instrumentation is valid for a calibrated range of up to 212°F, which bounds the proposed maximum UHS temperature of 102.8°F. In Reference 7, approval of the temporary change to TS SR 3.7.9.2 to increase the allowable UHS temperature from 102ºF to 102.8ºF until September 30, 2020 was issued on September 24, 2020 (ML20245E419).

3.0 TECHNICAL EVALUATION

The UHS is the heat sink for heat removed from the reactor core following all accidents and anticipated operational occurrences in which the unit is cooled down and placed on Residual Heat Removal (RHR) operation. The operating limits are based on conservative heat transfer analyses for the worst case loss of coolant accident (LOCA). The UHS is designed in accordance with Regulatory Guide (RG) 1.27, "Ultimate Heat Sink for Nuclear Power Plants," Revision 2.

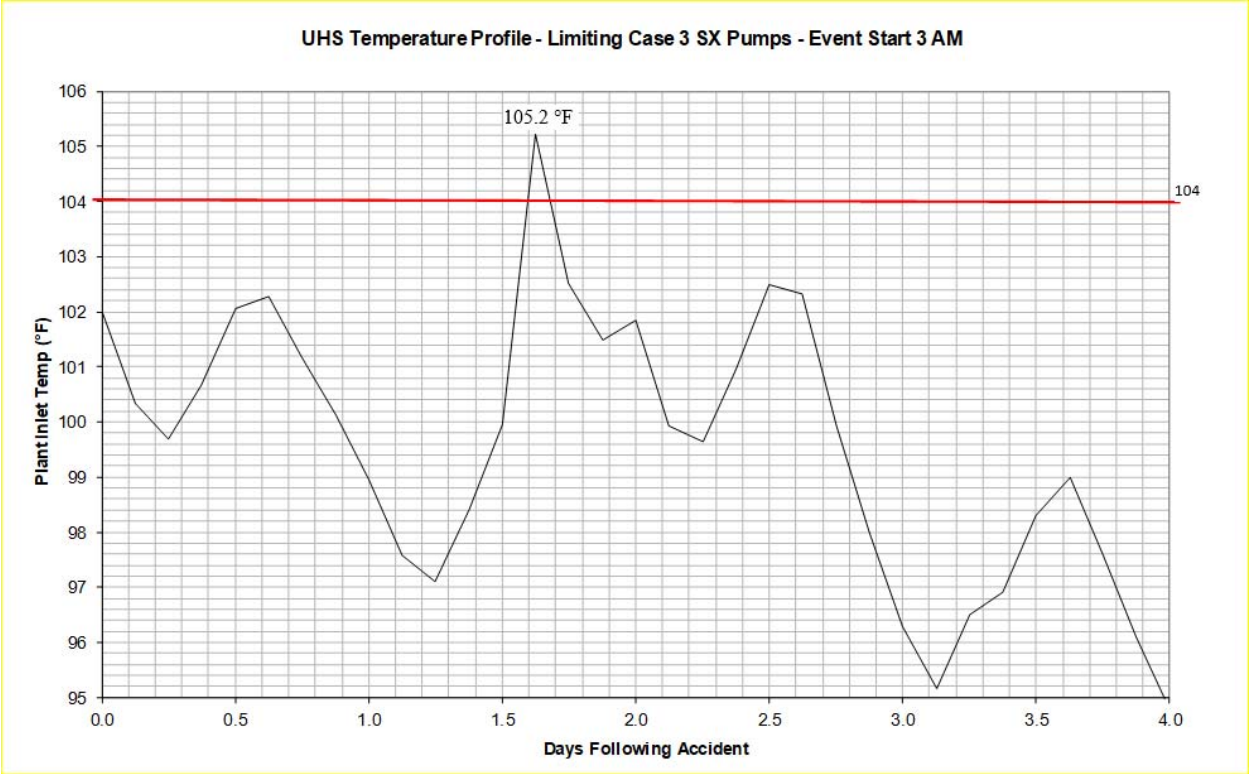
The current design basis analyses support an initial SX temperature of 102°F. This basis is documented and approved as part of the NRC's approval of TS amendments 189 (ML16209A218). An evaluation has been completed that supports a 0.8°F increase in SX temperature on accident analyses and containment response and analyses of the components served by SX. The current UHS analysis of record that was approved as part of the TS change to 102°F calculated the highest resulting UHS temperature following the design basis event

would be 105.2°F. Therefore, EGC has concluded that an increase of an additional 0.8°F in the initial UHS temperature would conservatively result in a corresponding increase in the highest calculated UHS temperature of 106°F (Refer to UHS temperature figure). The discussion below provides the evaluation of the post-accident temperature on the containment heat removal via the RCFCs, containment heat and reactor residual heat removal via the containment sumps, and Engineered Safety Features (ESF) equipment heat loads (e.g., ESF equipment coolers and room coolers). This evaluation does not take credit for the additional known gross volume in the UHS of approximately 40 acre-feet (592.6 vs 555.8) from the latest surveillance.

The UHS supplies water to the SX system, UHS and SX for certain circumstances can be used interchangeably in this document. The following evaluation demonstrates that there is no increase in risk as a result of the proposed temperature increase as discussed below.

3.1 UHS Temperature Profile

As discussed in the basis for TS amendments 189, EGC determined that with UHS starting at a temperature of 102°F, the highest UHS temperature during a worst case LOCA would be 105.2°F. The figure below shows the temperature response for this worst case LOCA at a start time of 0300. In support of TS amendment 189, EGC used 106°F to analyze the post-accident performance of the equipment served by SX except for the Reactor Containment Fan Coolers (RCFC) which used 104°F.



EGC has evaluated the impact of this initial UHS temperature increase of 0.8°F on the safety related component and accident analyses as discussed below.

3.2 Equipment Supported by SX

The Essential Service Water System (SX) supplies the safety related loads and components required for safe shutdown. These include cubicle coolers, pump coolers, diesel engines coolers, containment coolers, Component Cooling (CC) water heat exchangers and Main Control Room chiller condenser.

The post-accident performance of the equipment served by SX has been analyzed for a supply SX temperature of 106°F. These analyses use design fouling values and tube plugging limiting criteria. Actual tube plugging is lower than analyzed and fouling values are lower in Summer months due to higher SX flows through the cooling equipment. These margins remain during the period of the requested higher SX temperature limit of 102.8°F.

The component cooling heat exchanger tube plugging analysis also uses a supply SX temperature of 106°F. This is conservative because the timing of the limiting heat load is within 30 minutes from accident initiation, when the component cooling system is configured to supply the Residual Heat Removal heat exchanger, thus cooling the water from the Containment Recirculation sumps. The containment sump water temperature is over 120°F lower (~131 °F vs ~258 °F, Unit 1 is limiting) when the UHS reaches its peak temperature at over 36 hours from the start of the event.

The table below demonstrates the resulting maximum UHS temperature as a result of the DBA starting at different times of day. Due to the diurnal behavior of the UHS and the transient time for cooling, the amount of heat dissipated and thus the maximum UHS temperature during a DBA event is dependent on event initiation time. The table below shows that with an event starting at 0300, the maximum calculated UHS temperature is 105.2°F. This represents a margin of 0.8°F to the currently analyzed equipment limit of 106°F. In order to maintain this margin and the maximum calculated post-accident temperature, the initial UHS temperature is limited to 102.8°F. As shown, an event starting at other times results in lower maximum UHS temperature and would support a higher initial UHS temperature.

Based on the starting temperature of 102.8°F, it is concluded by Engineering Judgment that the maximum UHS temperature will not be higher than 106°F. In fact, the highest UHS temperature will be limited by an UHS volume that is greater than analyzed (592.6 vs 555.8 acre-ft). Sensitivity analyses performed in support of TS amendment 189 (ML16209A218) show the additional volume supports a reduction of 0.7°F in the peak UHS calculated temperature.

DBA - 3 SX pumps Running at the Start of the event

Time of Day	**DBA Max UHS Temp** (°F)	**Max Calculated UHS Temp** (°F)	**UHS Temp margin**	**UHS Temp Limit**
Midnight	106	104.5	1.5	103.5
03:00	106	105.2 (DB Limiting Case)	0.8	102.8
06:00	106	104.4	1.6	103.6
09:00	106	103.6	2.4	104.4
12:00	106	103.3	2.7	104.7
15:00	106	104	2	104
18:00	106	104.7	1.3	103.3
21:00	106	103.4	2.6	104.6

Discussion of the potential effect of possible fish scales, occasional precipitation of solids in the cooling lake, other known conditions on design fouling values, and subsequent impact on margin during the period of the requested higher SX temperature limit of 102.8°F were provided in Reference 6.

The fish scale event which occurred in July 2020 did not result in adverse consequences on the SX system and did not result in adverse effects for the equipment that is cooled by the SX system. Since then, no additional fish scale event has been identified at Braidwood. Braidwood's Lake Management strategy to prevent solids precipitation events is that of Managed Self Softening. This strategy utilizes chemical treatment together with the saturation characteristics of calcium carbonate to adjust the timing and the rate of the natural softening of the lake. Natural softening, or slow precipitation, is related to the saturation characteristics of calcium carbonate. Historical data shows that managed natural softening does not cause fouling of plant equipment. Therefore, fish scales and the natural softening of the cooling lake will not affect the fouling values used in the analyses and do not impact the margin for the period requested for the higher SX temperatures.

Based on the above, all equipment served by SX remains operable with the elevated SX temperature. The UHS temperature of 102.8°F supports the current design analyses.

The Reactor Containment Fan Coolers are addressed in the Accident Analyses section.

3.3 Impact on Accident Analyses

3.3.1 Containment Integrity (UFSAR Chapter 6)

The SX system supplies the Reactor Containment Fan Coolers (RCFCs) post-accident. Two trains of containment cooling, each of sufficient capacity to supply 100% of the design cooling requirement, are provided. Each train consisting of two RCFCs is supplied with cooling water from a separate train of SX and is powered from a separate ESF bus. During all operating conditions, air is drawn from the upper volume of the containment approximately 50 feet above the operating floor by a return air riser (one riser for each RCFC unit). The return air is then routed through the SX cooling coils, the Chilled Water (WO) cooling coils, and the fan and

discharge duct (one for each RCFC unit). The RCFC discharges directly into the lower containment volume. The WO chiller unit condensers are served by the SX return from the RCFC SX cooling coils. Upon receipt of an ESF signal, the WO condensers are automatically isolated from SX. In post-accident operation following an actuation signal, the RCFC fans are designed to start automatically in slow speed if not already running. If running in high (normal) speed, the fans automatically shift to slow speed. The fans are operated at the lower speed during accident conditions to prevent adverse fan conditions from the higher mass atmosphere. The temperature of the SX is an important factor in the heat removal capability of the fan units. The heat removal for the RCFCs is an input to the Accident Analyses.

These analyses use RCFC heat removal performance for an SX temperature of 104°F. This is acceptable because the SX temperature remains below 104°F for a period longer than the time of the calculated peak Containment pressure and temperature. This analysis and conclusion do not change with an initial UHS temperature of 102.8°F because the peak Containment temperature and pressure occur early in the accident well before the UHS post-accident temperature increases above the RCFC analyzed temperature of 104°F. This justification was approved by the NRC in TS amendments 189 (ML16209A218) and is described in more detail below.

The calculated UHS temperature profile shows the temperature initially decreases and remains below the starting temperature until about 36 hours after the event. A small excursion (< 0.5°F) above the initial temperature occurs at about 12 hours. By Engineering Judgment, the same profile is expected for a starting UHS temperature of 102.8°F with the temperature remaining below 104°F for at least 24 hours. The containment pressures and temperatures have been significantly reduced from the calculated peak value at 24 hours after the event. At 24 hours, the containment pressure is approximately 30 psi lower than the calculated peak (about 10 psig vs Limiting Pressure U-1 42.1 psig) and the containment temperature is approximately 80°F lower than the calculated peak (180°F vs 260°F). Similar margins are available for the Containment Sump water temperature. Therefore, the increase in the UHS temperature above 104°F after 24 hours will not result in exceeding any design criteria related to post-LOCA containment requirements. In addition, the heat removal curve used for the RCFCs is conservative because it is based on a tube plugging level of 10% while the actual tube plugging is < 2%.

For the Main Steamline Break accidents inside Containment, the calculated temperature is nearly 100°F lower at 24 hours after the event. The LOCA event is bounding for peak calculated pressure.

The current analysis of record for Braidwood Units 1 and 2 were reviewed and it was concluded that a 0.8°F increase in the UHS water temperature (from 102°F to 102.8°F) will have no or negligible impact on the large break loss of coolant accident (LBLOCA), small break loss of coolant (SBLOCA), long term core cooling (LTC) and non-LOCA analyses.

The LOCA analyses (and some non-LOCA transients) assume the minimum and/or the maximum water temperature of the Emergency Core Cooling System (ECCS) and the maximum cooling capacity of the reactor containment fan coolers (RCFC). Both of these assumptions can be potentially impacted by the assumption of the SX temperature. These impacts are addressed below.

3.3.2 Peak Clad Temperature Analyses

On December 28, 2020, the U.S. NRC approved license amendment 219 for Braidwood to replace current approved loss-of-coolant accident (LOCA) methodologies with a single newer approved LOCA methodology, "the FULL SPECTRUM™[1] LOCA Evaluation Model (FSLOCA™ EM)," (ML20315A516). The amendment has been implemented for Braidwood Unit 1 and will be implemented for Braidwood Unit 2 in Fall 2021. Therefore, the following discussion for Full Spectrum LOCA (FSLOCA) is applicable to Braidwood Unit 1 and the Large Break LOCA and Small Break LOCA discussions are applicable to Braidwood Unit 2.

Full Spectrum LOCA (FSLOCA) for Braidwood Unit 1

The Full Spectrum LOCA (FSLOCA) analyses cover the full spectrum of break sizes. The break size spectrum is divided into two regions. Region I provides coverage of cold leg breaks with an inventory loss just exceeding the capability of the normal charging pumps to a maximum size corresponding to the inner diameter of the accumulator line. The Region II analysis simulations include breaks above 1.0 ft^2 break area, up to a maximum size of a double ended guillotine break.

The calculated peak clad temperatures (PCT) are provided below:

	Region I	Time of PCT	Region II	Time of PCT	10 CFR 50.46 Criterion
Braidwood Unit 1	1,181°F	1,205 sec	1,641°F 1,643ºF	4.1 sec (Offsite power Available) 9.1 Sec (Loss of Offsite Power)	2,200°F

In the event of a large break LOCA (LBLOCA), the ECCS water is initially drawn from the refueling water storage tank (RWST). When the RWST level decreases to the LO-2 setpoint (46.7% level), the ECCS pumps are realigned to take suction from the Containment Recirculation sump. For the FSLOCA analyses, a conservative minimum switchover time of 1,038 seconds was calculated using the minimum usable refueling water storage tank (RWST) volume, maximum containment spray flow, and a conservative total SI flow rate (injected + spilled). For this initial calculation, it was conservatively assumed that the containment spray flow and safety injection (SI) flow begin at the start of the transient.

For the Region II analyses, the time of the PCT is less than 10 seconds and is well within the time of the ECCS switchover. The Region II analyses transients are terminated at 300 seconds.

The transient termination time was determined for each break size in the Region I break spectrum studies based on the criteria defined in Section 31.2.1 of WCAP-16996-P-A, Revision 1. For breaks larger than approximately 4 inches in diameter, transient termination occurred before the initial conservative minimum switchover time. For smaller breaks, transient termination occurred after the initial conservative minimum switchover time.

[1] FULL SPECTRUM and FSLOCA are trademarks or registered trademarks of Westinghouse Electric Company LLC, its subsidiaries, and/or affiliates in the United States of America and may be registered in other countries through the world. All rights reserved. Unauthorized use is strictly prohibited. Other names may be trademarks of their respective owners.

For the smaller breaks, containment pressure calculations were performed for select cases to determine a more realistic spray actuation time based on the spray actuation setpoint. These calculations showed that containment spray actuation would not occur until at least several hundred seconds after the break initiation and would not occur at all for the smallest breaks. The switchover time for each of the smaller breaks was then recalculated using the more realistic spray actuation time. The switchover time for a 3.7 inch break was determined to be 1,778 seconds. For all of the smaller breaks, transient termination occurred before the refined minimum switchover time.

Containment Model

For the Region II analysis, the containment pressure is calculated for each LOCA transient in the analysis using the COCO code. The COCO containment code is integrated into the WCOBRA/TRAC-TF2 thermal-hydraulic code. The transient-specific mass and energy releases calculated by the thermal-hydraulic code at the end of each timestep are transferred to COCO. COCO then calculates the containment pressure based on the containment model and the mass and energy releases, and transfers the pressure back to the thermal-hydraulic code as a boundary condition at the break, consistent with the methodology in Section 25.6 of WCAP-16996-P-A. The containment model for COCO calculates a conservatively low containment pressure. The heat removal curve used for the RCFCs is based on a minimum SX temperature of 32°F.

For the Region I analysis, the containment pressure is not calculated; a constant pressure equal to the initial containment pressure is modeled at the break.

Summary

For the Region I analysis, a refined minimum switchover time was calculated based on more realistic Containment Spray actuation time. The results demonstrated that transient termination, and thus PCT occurred before the refined minimum switchover time for all break sizes in the Region I break spectrum Studies. Therefore, changes in SX temperature does not impact the results of the FSLOCA Analyses.

For the Region II analysis, the PCT related transient is over while the ECCS is drawing suction from the RWST. Since SX temperature has no effect on the RWST water temperature, an increase in SX temperature will not impact the calculated PCT.

The Essential Service Water (SX) system, and thus the UHS, is the safety related water source for the Auxiliary Feedwater (AF) system. For the Region I analysis, the FSLOCA analysis uses 113.5°F for the temperature of the Auxiliary Feedwater make-up to the secondary side of the steam generators. The 113.5°F temperature is bounding with respect to the UHS temperature increase to 102.8ºF.

During the long term, when the ECCS water is drawing suction from the sump, the SX temperature can have an effect on the peak clad temperatures. However, at this point in the transient, the peak clad temperatures are significantly lower, and an increase in SX temperature will not result in the clad temperatures greater than the calculated peak clad temperatures.

Large Break LOCA (LBLOCA) Braidwood Unit 2

In the event of a LBLOCA, the ECCS water is initially drawn from the refueling water storage tank (RWST). When the RWST empties (or nearly empties), the pumps are realigned to the Containment sump, i.e., cold leg recirculation. Assuming no single failure and full runout flow from all the pumps, the earliest time the RWST can empty is in excess of 10 minutes.

The current licensing basis peak clad temperature (PCT) is 2047°F for Unit 2, including all penalties and benefits (UFSAR Table 15.6-15). UFSAR Table 15.6-1a show the limiting PCT occurs at 96 seconds for Braidwood Unit 2. Therefore, the PCT related transient is over while the ECCS is drawing suction from the RWST. Since SX temperature has no effect on the RWST water temperature, an increase in SX temperature of 0.8°F will not impact the calculated PCT.

During the long term, when the ECCS water is drawing suction from the sump, the SX temperature can have an effect on the peak clad temperatures. However, at this point in the transient, the peak clad temperatures are significantly lower, and a 0.8°F variance in SX temperature will not result in the clad temperatures challenging the calculated peaks.

Furthermore, it is conservative to minimize the containment pressure when evaluating overall ECCS performance as described in NUREG-0800, Section 6.2.1.5, "Minimum Containment Pressure Analysis for Emergency Core Cooling System Performance Capability Studies." Lower containment pressure results in a lower reflood rate and hence a higher PCT. To minimize containment pressure, maximum RCFC heat removal capacity is assumed in the LBLOCA analysis. The maximum RCFC heat removal capacity is based on an SX temperature of 32°F (UFSAR, Table 6.2-54). Therefore, raising the SX temperatures to 102.8°F does not impact this analysis. Based on the above, an increase in SX temperature of 0.8°F will have little or no detrimental impact on the outcome of the LBLOCA PCT.

Small Break LOCA (SBLOCA) Braidwood Unit 2

The calculated peak clad temperature for a SBLOCA is 1755°F for Unit 2 (UFSAR Table 15.6-15).

The NOTRUMP Evaluation Model which is used for the SBLOCA analysis does not explicitly model the UHS; therefore, this change does not directly impact the SBLOCA analyses (UFSAR 15.6.5.2.2).

Auxiliary Feedwater (AF) is modeled in the SBLOCA analysis with a temperature of 125°F. The SX system is the safety related backup to the AF system. Based on the results of the UHS temperature analysis, the AF temperature could reach a maximum of 106°F (105.2 + 0.8). This maximum temperature is bounded by the temperature used in the SBLOCA analysis.

The temperature of the safety injection water in the SBLOCA analysis is assumed to be at 120°F, based on the RWST as the source. The UHS temperature change does not impact the RWST.

UIFSAR Table 15.6-1e shows the time of the PCT (17,491.8 seconds for a 1.5 inch break) for a SBLOCA can extend into the Containment Recirculation phase of ECCS operation.

The temperature of the recirculation water is taken as 212°F. Design analyses that were completed in support of the TS amendments 189 (ML16209A218) have calculated the RHR heat exchanger discharge temperature to be below 212°F. The CC Heat Exchanger has been evaluated and has been found to be able to remove the required heat load that supports the assumptions of the calculation with an SX supply temperature of 106°F. Thus, the assumption of the SBLOCA analysis for the recirculation water temperature of 212°F is validated.

Based on the above, a 0.8°F increase in SX temperature will have no detrimental impact on the outcome of the SBLOCA PCT.

Non-LOCA Analyses Braidwood Units 1 and 2

For three non-LOCA events, main steam line break (MSLB), feed line break (FLB) and steam generator tube rupture (SGTR), the ECCS is modeled and assumed to operate. For these events, the transient is terminated well before the RWST is drained down since only the charging and the safety injection pumps actuate during these events. Therefore, a 0.8°F increase in SX temperature will have no detrimental impact on the outcome of the MSLB, FLB and the SGTR results.

3.3.3 Long Term Core Cooling and Hot Leg Switchover Analysis

The Component Cooling Heat Exchangers have been evaluated and have been found to be able to remove the required heat load that supports the assumptions of the Containment Analysis with an SX supply temperature of 106°F. The Hot Leg Switchover analysis for Braidwood Station has determined that switchover must occur at 6 hours after the event. The SX temperature at 6 hours is below the temperature at the start of the event. The existing design analysis remain acceptable with a maximum UHS starting temperature of 102.8°F.

3.3.4 CC System to RCPs

The maximum CC temperature to the Reactor Coolant Pumps (RCP) is 105°F during normal plant operation. This temperature limit is raised to 120°F for a short period (3 hours) when the Residual Heat Removal system is first used during RCS cooldown. The postulated increase in CC temperature of 0.8°F is found acceptable by Engineering Judgement. This is based on the small increase and the short duration considering the diurnal cycle of the UHS temperature profile.

3.3.5 Other Analyses

Other considerations, such as the impact of increasing the UHS temperature to 102.8°F on Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," and Station Blackout (SBO), were also evaluated.

GL 96-06

The period of interest for the GL 96-06 concern of water hammer is the first few minutes post-accident, while the pumps and fans are restarting following load shed. The analysis of record reviewed the impact with an increase in SX temperature from 100°F to 102°F and determined that a slight increase in fluid temperature will not result in significant changes to the amount of voiding and thus negligible impacts to void collapse and the existing results of this

analysis. The additional degree from an initial SX temperature of 102.8°F does not change the conclusion of the analysis. This qualitative assessment is supported by the results of the evaluation that was completed for a fluid temperature of 105°F (Reference 2).

Diesel Driven AF Pump Operation during Loss of All AC Power

In the event of a loss of all AC power (i.e., Station Blackout or SBO), a diesel driven SX booster pump operates to provide cooling water to the diesel driven AF pump and engine cooler. Due to the configuration of the discharge piping to the lake, there is insufficient booster pump head to maintain once-through flow to the lake during this event. Thus, flow recirculates through various components back to the diesel driven SX booster pump suction. This results in isolation of the cooling water heat sinks and heat-up of the isolated SX loop during the SBO coping period.

Design analysis evaluates this transient and concludes that AF diesel engine jacket water temperature will not exceed the engine trip setpoint in 2 hours. The calculation evaluates a maximum UHS temperature of 102°F. The analysis used a plugging level of 5 tubes for the 102°F case. The analysis also determined that the allowed tube plugging decreases by two (2) tubes for each °F increase in the SX temperature.

The actual numbers of tubes that are plugged for the heat exchangers (1/2SX01K) is zero (0) for Unit 1 and one (1) for Unit 2. The actual plugging level supports a maximum SX temperature of 104°F. Therefore, raising the SX temperature of 102.8°F is acceptable.

4.0 REGULATORY EVALUATION

4.1 APPLICABLE REGULATORY REQUIREMENTS/CRITERIA

10 CFR 50.36, "Technical Specifications," paragraph (c)(2)(i) states that limiting conditions for operation are the lowest functional capability or performance level of equipment required for safe operation of the facility, and when a limiting condition for operation is not met, the licensee shall shut down the reactor or follow any remedial actions permitted by the TS until the condition can be met.

The design of the UHS satisfies the requirements of 10 CFR 50.36(c)(2)(ii), Criterion 3. This criterion states the following:

> (ii) A Technical Specification Limiting Condition for Operation (TS LCO) of a nuclear reactor must be established for each item meeting one or more of the following criteria:
>
> Criterion 3. A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

The proposed change does not change the design function or purpose of the UHS, therefore, Criterion 3 of 10 CFR 50.36(c)(2)(ii) continues to be met.

General Design Criteria 2, "Design bases for protection against natural phenomena," and General Design Criteria 44, "Cooling water," of Appendix A to 10 CFR Part 50, "General Design Criteria for Nuclear Power Plants," provides design considerations for the UHS. RG 1.27, "Ultimate Heat Sink for Nuclear Power Plants," Revision 2, dated January 1976, provides an acceptable approach for satisfying these criteria. The basis provided in RG 1.27, Revision 2, was employed for the temperature analysis of the Braidwood Station UHS.

General Design Criteria 5, “Sharing of structures, systems and components,” of Appendix A to 10 CFR Part 50 also provides design criteria applicable to the UHS, a shared system between Braidwood Station Units 1 and 2. The proposed change, including the re-analysis of the UHS DBA, was evaluated consistent with the existing methodology which considers a DBA event (i.e., a LOCA with LOOP) along with the safe non-accident shutdown and cooldown of the opposite unit. Therefore, GDC 5 criteria continue to be met by the reanalysis of the UHS DBA at the elevated initial UHS temperature of 102.8°F.

The proposed changes continue to ensure that the plant's safety related equipment will maintain its design function at the higher UHS temperature. Therefore, there is no adverse impact of this change on Braidwood Station plant safety.

4.2 NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," Exelon Generation Company, LLC (EGC) is requesting a change to the Technical Specifications (TS) of Renewed Facility Operating License Nos. NPF-72 and NPF-77 for Braidwood Station, Units 1 and 2.

The Ultimate Heat Sink (UHS) for Braidwood Station, Units 1 and 2 provides a heat sink for processing and operating heat from safety related components during a transient or accident, as well as during normal operation. This is done by utilizing the Essential Service Water (SX) System and the Component Cooling Water (CC) system. The UHS consists of an excavated essential cooling pond integral with the main cooling pond. The volume of the excavated essential cooling pond is sized to permit the safe shutdown and cooldown of both Braidwood Station units for a 30 day period, including a design basis event with no additional makeup water source. As discussed in the Braidwood Station Updated Final Safety Analysis Report (UFSAR), the design basis event for the Braidwood Station UHS is a Loss of Coolant Accident (LOCA) coincident with a Loss of Offsite Power (LOOP) in one unit, in conjunction with a normal shutdown of the other unit. The UHS provides a heat sink for process and operating heat from safety-related components during the UHS design basis event.

The proposed change modifies the acceptance criterion in TS Surveillance Requirement (SR) 3.7.9.2. The current TS SR 3.7.9.2 states: "Verify average water temperature of UHS is ≤ 102.8°F until September 30, 2020. After September 30, 2020, verify average water temperature of UHS is ≤ 102°F." The proposed TS SR 3.7.9.2 states: "Verify average water temperature of UHS is ≤ 102.8°F until September 30, 2021. After September 30, 2021, verify average water temperature of UHS is ≤ 102°F."

The evaluations and analyses performed to support the proposed license amendment demonstrate that the plant's safety related equipment will maintain its design function at the higher UHS temperature.

According to 10 CFR 50.92, "Issuance of amendment," paragraph (c), a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

1) Involve a significant increase in the probability or consequences of an accident previously evaluated;
2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or
3) Involve a significant reduction in a margin of safety.

In support of this determination, an evaluation of each of the three criteria set forth in 10 CFR 50.92 is provided below:

1. Does the Proposed Change Involve a Significant Increase in the Probability or Consequences of an Accident Previously Evaluated?

   Response: No

The likelihood of a malfunction of any systems, structures, or components (SSCs) supported by the Ultimate Heat Sink (UHS) is not significantly increased by increasing the allowable UHS temperature from ≤ 102°F to ≤ 102.8°F. The UHS provides a heat sink for process and operating heat from safety related components during a transient or accident, as well as during normal operation. The proposed change does not make any physical changes to any plant SSCs, nor does it alter any of the assumptions or conditions upon which the UHS is designed. The UHS is not an initiator of any analyzed accident. All equipment supported by the UHS has been evaluated to demonstrate that their performance and operation remains as described in the UFSAR with no increase in probability of failure or malfunction.

The SSCs credited to mitigate the consequences of postulated design basis accidents remain capable of performing their design basis function. The change in maximum UHS temperature has been evaluated using the UFSAR described methods to demonstrate that the UHS remains capable of removing normal operating and post-accident heat. The change in UHS temperature and resulting containment response following a postulated design basis accident has been demonstrated to not be impacted. Additionally, all the UHS supported equipment, credited in the accident analysis to mitigate an accident, has been shown to continue to perform their design function as described in the UFSAR.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the Proposed Change Create the Possibility of a New or Different Kind of Accident from any Accident Previously Evaluated?

   Response: No

The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated. The proposed change does not introduce any new modes of plant operation, change the design function of any SSC, or change the mode of operation of any

SSC. There are no new equipment failure modes or malfunctions created as affected SSCs continue to operate in the same manner as previously evaluated and have been evaluated to perform as designed at the increased UHS temperature and as assumed in the accident analysis. Additionally, accident initiators remain as described in the UFSAR and no new accident initiators are postulated as a result of the increase in UHS temperature.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the Proposed Change Involve a Significant Reduction in a Margin of Safety?

Response: No

The proposed change continues to ensure that the maximum temperature of the cooling water supplied to the plant SSCs during a UHS design basis event remains within the evaluated equipment limits and capabilities assumed in the accident analysis. The proposed change does not result in any changes to plant equipment function, including setpoints and actuations. All equipment will function as designed in the plant safety analysis without any physical modifications. The proposed change does not alter a limiting condition for operation, limiting safety system setting, or safety limit specified in the Technical Specifications.

The proposed change does not adversely impact the UHS inventory required to be available for the UFSAR described design basis accident involving the worst case 30-day period including losses for evaporation and seepage to support safe shutdown and cooldown of both Braidwood Station units. Additionally, the structural integrity of the UHS is not impacted and remains acceptable following the change, thereby ensuring that the assumptions for both UHS temperature and inventory remain valid.

Therefore, since there is no adverse impact of this proposed change on the Braidwood Station safety analysis, there is no reduction in the margin of safety of the plant.

4.3 CONCLUSIONS

In conclusion, based on the considerations discussed above, (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.

5.0 ENVIRONMENTAL CONSIDERATION

EGC has evaluated this proposed operating license amendment consistent with the criteria for identification of licensing and regulatory actions requiring environmental assessment in accordance with 10 CFR 51.21, "Criteria for and identification of licensing and regulatory actions requiring environmental assessments." EGC has determined that this proposed change meets the criteria for a categorical exclusion set forth in paragraph (c)(9) of 10 CFR 51.22, "Criterion or categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review," and as such, has determined that no irreversible consequences exist in accordance with paragraph (b) of 10 CFR 50.92, "Issuance of

amendment." This determination is based on the fact that this change is being proposed as an amendment to the license issued pursuant to 10 CFR 50, "Domestic Licensing of Production and Utilization Facilities," which changes a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, "Standards for Protection Against Radiation," or which changes an inspection or a surveillance requirement, and the amendment meets the following specific criteria:

(i) The amendment involves no significant hazards consideration.

As demonstrated in Section 4.2, "No Significant Hazards Consideration," the proposed change does not involve any significant hazards consideration.

(ii) There is no significant change in the types or significant increase in the amounts of any effluent that may be released offsite.

The proposed change does not result in an increase in power level, does not increase the production nor alter the flow path or method of disposal of radioactive waste or byproducts. The proposed change continues to ensure that the plant's safety related equipment will maintain its design function at the higher UHS temperature. Therefore, there is no impact of this change on Braidwood Station safety analyses including the consequences of such events.

Based on the above evaluation, the proposed change will not result in a significant change in the types or significant increase in the amounts of any effluent released offsite.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure.

There is no net increase in individual or cumulative occupational radiation exposure due to the proposed change. The proposed action will not change the level of controls or methodology used for processing of radioactive effluents or handling of solid radioactive waste, nor will the proposed action result in any change in the normal radiation levels within the plant.

Based on the above information, there will be no increase in individual or cumulative occupational radiation exposure resulting from this change.

6.0 REFERENCES

1. NRC Safety Evaluation Report, Braidwood Station Units 1 and 2 – Issuance of Amendments RE: Ultimate Heat Sink Temperature Increase, dated July 26, 2016. (ADAMS Accession No. ML16133A438).

2. Engineering Change (EC) Evaluation 632041, Revision 0, "Support Analyses for the License Amendment Request to Raise the Maximum UHS Temperature for the UHS in TS LCO 3.7.9."

3. Engineering Change (EC) Evaluation 634236, Revision 0, "Engineering Support Material for Emergent LAR UHS Temperature Increase to 102.8ºF Year 2021."

4. WCAP-10325-P-A, "Westinghouse LOCA Mass and Energy Release Model for Containment Design March 1979 Version," dated May 1983.

5. Letter from D. Murray (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "License Amendment to Braidwood Station, Units 1 and 2, Technical Specification 3.7.9, 'Ultimate Heat Sink,'" dated July 15, 2020 (ADAMS Accession No. ML20197A434).

6. Response to Request for Additional Information Regarding License Amendment to Braidwood Station, Units 1 and 2, Technical Specification 3.7.9, "Ultimate Heat Sink," dated August 14, 2020 (ADAMS Accession No. ML20227A375)

7. NRC Safety Evaluation Report, Braidwood Station, Units 1 and 2 – Issuance of Amendments Nos. 218 and 218 Re: Revision of Technical Specifications for the Ultimate Heat Sink, (EPID L_2020-LLA-0159), dated September 24, 2020 (ADAMS Accession No. ML20245E419).

8. NRC Safety Evaluation Report, Braidwood Station, Units 1 and 2, and Byron Station, Units 1 and 2 – Issuance of Amendments Nos. 219, 219, 223, and 223 Re: Revision of Technical Specifications 5.6.5, "Core Operating Limits Report (COLR)", (EPID L-2020-LLA-0038), dated December 28, 2020 (ADAMS Accession No. ML20315A516)

ATTACHMENT 2

BRAIDWOOD STATION
UNITS 1 and 2

Renewed Facility Operting License Nos. NPF-72 and NPF-77

Docket Nos. STN-50-456 and STN-50-457

Markup of Technical Specifications Page

3.7 PLANT SYSTEMS

3.7.9 Ultimate Heat Sink (UHS)

LCO 3.7.9 The UHS shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. UHS inoperable due to average water temperature.	A.1 Be in MODE 3. AND A.2 Be in MODE 5.	12 hours 36 hours
B. UHS inoperable for reasons other than Condition A.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.9.1	Verify water level of UHS is ≥ 590 ft Mean Sea Level (MSL).	In accordance with the Surveillance Frequency Control Program
SR 3.7.9.2	Verify average water temperature of UHS is ≤ 102.8°F until September 30, 2021~~0~~. After September 30, 2021~~0~~, verify average water temperature of UHS is ≤ 102°F.	In accordance with the Surveillance Frequency Control Program

ATTACHMENT 3

BRAIDWOOD STATION
UNITS 1 and 2

Renewed Facility Operting License Nos. NPF-72 and NPF-77

Docket Nos. STN-50-456 and STN-50-457

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(For Information Only)

3.7 PLANT SYSTEMS

3.7.9 Ultimate Heat Sink (UHS)

LCO 3.7.9 The UHS shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. UHS inoperable due to average water temperature.	A.1 Be in MODE 3. AND A.2 Be in MODE 5.	12 hours 36 hours
B. UHS inoperable for reasons other than Condition A.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.9.1	Verify water level of UHS is ≥ 590 ft Mean Sea Level (MSL).	In accordance with the Surveillance Frequency Control Program
SR 3.7.9.2	Verify average water temperature of UHS is ≤ 102.8°F until September 30, 2021. After September 30, 2021, verify average water temperature of UHS is ≤ 102°F.	In accordance with the Surveillance Frequency Control Program

ATTACHMENT 4

BRAIDWOOD STATION
UNITS 1 and 2

Renewed Facility Operting License Nos. NPF-72 and NPF-77

Docket Nos. STN-50-456 and STN-50-457

Mark-up of Technical Specification Bases Pages

(For Information Only)

BASES

APPLICABLE SAFETY ANALYSES

The UHS is the sink for heat removed from the reactor core following all accidents and anticipated operational occurrences in which the unit is cooled down and placed on Residual Heat Removal (RHR) operation. The UHS is also the normal heat sink for condenser cooling via the Circulating Water System. Unit operation at full power represents the UHS maximum heat load. Its maximum post accident heat load occurs 20 minutes after a design basis Loss Of Coolant Accident (LOCA). Near this time, the unit switches from injection to recirculation and the containment cooling systems and RHR are required to remove the core decay heat.

The operating limits are based on conservative heat transfer analyses for the worst case LOCA. Reference 1 provides the details of the assumptions used in the analysis, which include worst expected meteorological conditions, conservative uncertainties when calculating decay heat, and worst case single failure (e.g., single failure of a manmade structure). The UHS is designed in accordance with Regulatory Guide 1.27 (Ref. 2), which requires a 30 day supply of cooling water in the UHS.

The UHS satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The UHS is required to be OPERABLE and is considered OPERABLE if it contains a sufficient volume of water at or below the maximum temperature that would allow the SX System to operate for at least 30 days following the design basis LOCA without the loss of Net Positive Suction Head (NPSH), and without exceeding the maximum design temperature of the equipment served by the SX System. To meet this condition, the UHS temperature should not exceed 102°F *(102.8°F until September 30, 2021)* and the level should not fall below 590 ft mean sea level during normal unit operation.

APPLICABILITY

In MODES 1, 2, 3, and 4, the UHS is required to support the OPERABILITY of the equipment serviced by the UHS and required to be OPERABLE in these MODES.

In MODE 5 or 6, the OPERABILITY requirements of the UHS are determined by the systems it supports.

BASES

ACTIONS

A.1 and A.2

If the UHS is inoperable due to average water temperature, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 5 within 36 hours.

B.1 and B.2

If the UHS is inoperable for reasons other than Condition A, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.9.1

This SR verifies that adequate long term (30 day) cooling can be maintained. The specified level also ensures that sufficient NPSH is available to operate the SX pumps. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. This SR verifies that the UHS water level is ≥ 590 ft mean sea level United States Geological Society datum.

SR 3.7.9.2

This SR verifies that the SX System is available to cool the CC System to at least its maximum design temperature with the maximum accident or normal design heat loads for 30 days following a Design Basis Accident. This SR verifies that the average water temperature of the UHS is ≤ 102°F *(102.8°F until September 30, 2021)*, as measured at the discharge of an SX pump. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.