CP&L

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November 6, 2000

SERIAL: BSEP 00-0150

U. S. Nuclear Regulatory Commission
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BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 AND 50-324/LICENSE NOS. DPR-71 AND DPR-62
SUPPLEMENT TO REQUEST FOR LICENSE AMENDMENTS (TSC 00TSC04)
ULTIMATE HEAT SINK TEMPERATURE
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Gentlemen:

In a letter dated April 26, 2000 (i.e., Serial: BSEP 00-0050), Carolina Power & Light (CP&L) Company requested a revision to the Technical Specifications (TSs) for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2. The proposed license amendments revise the maximum 24 hour average Ultimate Heat Sink temperature allowed by TS 3.7.2, "Service Water (SW) System and Ultimate Heat Sink (UHS)."

On August 15, 2000, the NRC requested additional information regarding the proposed license amendments. Enclosure 1 provides the requested information.

As described in Enclosure 1, CP&L's April 26, 2000, submittal requested license amendments to increase the maximum 24 hour average UHS temperature from 89°F to 90.5°F. The April 26, 2000, submittal did not request a revision to the temperature range specified in Condition H of TS 3.7.2 (i.e., a UHS temperature of 89°F was conservatively retained as the value at which operators would initiate hourly intake canal temperature monitoring). However, as discussed with the NRC in a telephone call on September 5, 2000, CP&L is now requesting to revise the Condition H temperature range from "> 89°F and ≤ 92°F" to "> 90.5°F and ≤ 92°F" to correspond to the proposed change to the maximum 24 hour average UHS temperature limit of 90.5°F. Additionally, Surveillance Requirement 3.7.2.2 is being revised to require verification that the UHS temperature is ≤ 90.5°F versus ≤ 89°F. These changes are being made to be consistent with TSTF-330, "Allowed Outage Time - Ultimate Heat Sink," Revision 3, which is currently under review by the NRC.

Enclosures 2, 3, 4, and 5 contain updated revisions to TS pages. Updated revisions to Unit 1 Bases pages associated with the proposed amendments are included in Enclosure 6. These bases pages are provided for information only and do not require issuance by the NRC. Revisions to Unit 2 Bases pages are identical to the Unit 1 pages and are not included as part of this submittal.

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The information provided by this submittal does not change the intent or the justification for the requested amendments. CP&L has determined that this supplement does not affect the bases for concluding that the proposed amendments do not involve a Significant Hazards Consideration. As such, the 10 CFR 50.92 Evaluation, provided in the April 26, 2000, submittal and published in the Federal Register (i.e., 65 FR 31356, dated May 17, 2000) remains valid.

Please refer any questions regarding this submittal to Mr. David C. DiCello, Manager - Regulatory Affairs, at (910) 457-2235.

Sincerely,

for JSK

John S. Keenan

KMN/kmn

Enclosures:

1. Response To Request For Additional Information
2. Typed Technical Specification Pages - Unit No. 1
3. Typed Technical Specification Pages - Unit No. 2
4. Marked-up Technical Specification Pages - Unit No. 1
5. Marked-up Technical Specification Pages - Unit No. 2
6. Marked-up Bases Pages - Unit No. 1 (For Information Only)

C. J. Gannon, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, and agents of Carolina Power & Light Company.

Notary (Seal)

M. A. Turkal

My commission expires: May 18, 2003

cc:

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ENCLOSURE 1

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
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Background

In a letter dated April 26, 2000, Carolina Power & Light (CP&L) Company requested a revision to the Technical Specifications (TSs) for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2. The proposed license amendments revise the maximum 24 hour average Ultimate Heat Sink temperature allowed by TS 3.7.2, "Service Water (SW) System and Ultimate Heat Sink (UHS)." Specifically, Condition H of TS 3.7.2 provides a UHS water temperature range of > 89°F and ≤ 92°F. The Required Action for UHS water temperature within this range is to verify, once per hour, that the water temperature of the UHS is ≤ 89°F when averaged over the previous 24 hours. Should the UHS water temperature exceed 92°F or the 24 hour average UHS water temperature exceed 89°F, Condition I of TS 3.7.2 would require the affected unit to be in Mode 3 in 12 hours and Mode 4 in 36 hours. The requested amendments increase the maximum 24 hour average UHS temperature from 89°F to 90.5°F.

On August 15, 2000, the NRC requested additional information regarding CP&L's request for license amendments. Each of the NRC's questions are listed below, along with CP&L's response.

Question 1: Is there any situation that the water level in the pump well of the intake structure be lower than the intake canal water level?

Response: The water level in the pump well of the intake structure is always expected to be lower than the intake canal water level. As part of BSEP's SW system hydraulic analyses, an analysis of pump performance relative to pump net positive suction head (NPSH) was performed. This analysis accounts for the head losses at various flow rates through the elements of the intake system including the fish diversion structure, intake canal, trash bar racks and traveling screens. Pump available NPSH is calculated at the pump suction nozzle and the various head losses are measured directly in feet of elevation lost from the intake canal entrance to the pump suction nozzle. The pump intake water level value provided in CP&L's April 26, 2000, submittal is based on the results of this analysis, and is referenced to the design lowest canal level. This intake level conservatively supports the SW system flow requirements to satisfy the UHS function.

Surveillance Requirement (SR) 3.7.2.1 requires verification that the water level in the SW pump suction bay of the intake structure is ≥ -6 feet mean sea level. The SR requires the water level to be verified every 24 hours. To perform this verification, a reading is obtained from one of two level indicators (i.e., one for each unit), that records water level in the SW pump suction bay of the intake structure as measured at the face of the intake structure just before the intake trash bar racks and traveling screens. The SR acceptance range for water level is ≥ -5 feet to < 15 feet.

Question 2: In proposed TS 3.7.2.H, explain why the condition statement temperature remains at "greater than 89°F", rather than increasing it to "greater than 90.5°F" to correspond with the proposed action statement change.

Response: CP&L's April 26, 2000, submittal did not request a revision to the temperature range specified in Condition H of TS 3.7.2 (i.e., a UHS temperature of 89°F was conservatively retained as the value at which operators would initiate hourly intake canal temperature monitoring). However, as discussed with the NRC in a telephone call on September 5, 2000, CP&L is now requesting to revise the Condition H temperature range from "> 89°F and ≤ 92°F" to "> 90.5°F and ≤ 92°F" to correspond to the proposed change to the maximum 24 hour average UHS temperature limit of 90.5°F. Additionally, Surveillance Requirement 3.7.2.2 is being revised to require verification that the UHS temperature is ≤ 90.5°F versus ≤ 89°F. These changes are being made to be consistent with TSTF-330, "Allowed Outage Time - Ultimate Heat Sink," Revision 3, which is currently under review by the NRC. This additional proposed change revises Condition H of TS 3.7.2 and SR 3.7.2.2 as follows.

<u>Current Requirement</u>

TS 3.7.2, Condition H states:

Water temperature of the UHS > 89°F and ≤ 92°F.

SR 3.7.2.2 states:

Verify the water temperature of UHS is ≤ 89°F.

<u>Proposed Change</u>

Revise TS 3.7.2, Condition H to state:

Water temperature of the UHS > 90.5°F and ≤ 92°F.

Revise SR 3.7.2.2 to state:

Verify the water temperature of UHS is ≤ 90.5°F.

Question 3: Is the UHS ever relied upon for immediate heat removal, such as to prevent containment overpressurization?

Response: There is no reliance on the UHS for immediate heat removal to prevent containment overpressurization or overheating, or to protect the core. The safety-related flows served by the Nuclear Service Water (NSW) subsystem are the Emergency Diesel Generator (EDG) jacket water coolers, Residual Heat Removal (RHR) system heat exchangers, RHR pump seal coolers, RHR SW pump motor coolers, RHR room coolers, and Core Spray room coolers. None of these components are relied upon for immediate heat removal to maintain containment or core integrity due to a plant event or transient.

Question 4: Can the cooling water discharged from the plant (either from normal plant operation or accident conditions) affect the UHS intake water temperature? If so, explain why the increase in the 24 hour average temperature is acceptable.

Response: SW discharge flows from the plant into the discharge canal, which is approximately six miles long. From the discharge canal, the SW discharge flow is pumped into the Atlantic Ocean approximately one half-mile off shore and approximately three miles west of the Cape Fear River outfall. The discharge canal is designed such that excess heat is substantially dissipated in the discharge flow prior to discharge into the Atlantic Ocean. Ocean surface evaporation, wave churning, tidal changes, wind speed and direction, and ocean currents dissipate heat of the slightly warmer discharge water. The BSEP intake canal is approximately two miles long. Cooling water for the SW system is supplied from the Cape Fear River at the tidal estuary, which is located approximately eight miles upstream of the river outfall to the Atlantic Ocean, via the intake canal. Therefore, SW discharged from the plant cannot affect the UHS intake water temperature, under both normal plant operation and accident conditions.

The EDG jacket cooler SW is the only significant SW flow that returns to the intake canal by an above-surface discharge pipe adjacent to the intake structure. Assuming a worst-case unit event and loss of offsite power such that both units shut down, this flow represents approximately six percent of the nominal SW flow. Further, under this worst-case scenario, the flow of the intake canal is drastically reduced by the loss of Circulating Water system pump flow, which would be expected if both units were shut down. The intake canal is approximately 300 feet wide, normally approximately 22 feet deep and, as previously noted, about two miles long. This corresponds to a volume of water equal to approximately 52 million gallons and a surface area greater than three million square feet. Even at minimum intake canal elevation, this canal volume is still quite large. A flow of approximately 2000 gallons per minute for the EDG SW supply is small relative to the volume of this canal. The SW pumps are deep draft and take suction approximately 20 feet below the normal surface elevation. Without the normal summertime flow of the Circulating Water system pumps (i.e., approximately

1,092,000 gallons per minute), the approximately 19,000 gallons per minute nominal safety-related SW system flow for both BSEP units in this scenario would cause only minimal intake canal velocity and result in thermal stratification of the canal. The warmer EDG jacket cooler SW return flow would spread out over the surface of the canal while the NSW pumps take suction from near the bottom of the canal. Thus, there would be no impact on the water temperature for the UHS function.

ENCLOSURE 2

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
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ULTIMATE HEAT SINK TEMPERATURE
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Typed Technical Specification Pages - Unit No. 1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. One required NSW pump inoperable. AND Two required CSW pumps inoperable.	G.1 Verify by administrative means that two Unit 1 NSW pumps are OPERABLE. AND G.2.1 Restore required NSW pump to OPERABLE status. OR G.2.2 Restore one required CSW pump to OPERABLE status.	Immediately 72 hours 72 hours
H. Water temperature of the UHS > 90.5°F and ≤ 92°F.	H.1 Verify water temperature of the UHS is ≤ 90.5°F averaged over previous 24 hour period.	Once per hour

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	Verify the water level in the SW pump suction bay of the intake structure is ≥ -6 ft mean sea level.	24 hours
SR 3.7.2.2	Verify the water temperature of UHS is ≤ 90.5°F.	24 hours
SR 3.7.2.3	----------NOTE---------- Isolation of flow to individual components does not render SW System inoperable. ---------- Verify each SW System manual, power operated, and automatic valve in the flow paths servicing safety related systems or components, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.7.2.4	----------NOTES---------- 1. A single test at the specified Frequency will satisfy this Surveillance for both units. 2. Isolation of flow to individual components does not render SW System inoperable. ---------- Verify automatic transfer of each DG cooling water supply from the normal SW supply to the alternate SW supply on low DG jacket cooling water supply pressure.	92 days

(continued)

ENCLOSURE 3

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 AND 50-324/LICENSE NOS. DPR-71 AND DPR-62
SUPPLEMENT TO REQUEST FOR LICENSE AMENDMENTS (TSC 00TSC04)
ULTIMATE HEAT SINK TEMPERATURE
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Typed Technical Specification Pages - Unit No. 2

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. One required NSW pump inoperable. AND Two required CSW pumps inoperable.	G.1 Verify by administrative means that two Unit 2 NSW pumps are OPERABLE. AND G.2.1 Restore required NSW pump to OPERABLE status. OR G.2.2 Restore one required CSW pump to OPERABLE status.	Immediately 72 hours 72 hours
H. Water temperature of the UHS > 90.5°F and ≤ 92°F.	H.1 Verify water temperature of the UHS is ≤ 90.5°F averaged over previous 24 hour period.	Once per hour

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	Verify the water level in the SW pump suction bay of the intake structure is ≥ -6 ft mean sea level.	24 hours
SR 3.7.2.2	Verify the water temperature of UHS is ≤ 90.5°F.	24 hours
SR 3.7.2.3	----------NOTE---------- Isolation of flow to individual components does not render SW System inoperable. ---------- Verify each SW System manual, power operated, and automatic valve in the flow paths servicing safety related systems or components, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.7.2.4	----------NOTES---------- 1. A single test at the specified Frequency will satisfy this Surveillance for both units. 2. Isolation of flow to individual components does not render SW System inoperable. ---------- Verify automatic transfer of each DG cooling water supply from the normal SW supply to the alternate SW supply on low DG jacket cooling water supply pressure.	92 days

(continued)

ENCLOSURE 4

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 AND 50-324/LICENSE NOS. DPR-71 AND DPR-62
SUPPLEMENT TO REQUEST FOR LICENSE AMENDMENTS (TSC 00TSC04)
ULTIMATE HEAT SINK TEMPERATURE
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Marked-up Technical Specification Pages - Unit No. 1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. One required NSW pump inoperable. AND Two required CSW pumps inoperable.	G.1 Verify by administrative means that two Unit 1 NSW pumps are OPERABLE. AND G.2.1 Restore required NSW pump to OPERABLE status. OR G.2.2 Restore one required CSW pump to OPERABLE status.	Immediately 72 hours 72 hours
H. Water temperature of the UHS > ~~89~~ 90.5 °F and ≤ 92°F.	H.1 Verify water temperature of the UHS is ≤ ~~89~~ 90.5 °F averaged over previous 24 hour period.	Once per hour

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	Verify the water level in the SW pump suction bay of the intake structure is ≥ -6 ft mean sea level.	24 hours
SR 3.7.2.2	Verify the water temperature of UHS is ≤ ~~89~~ 90.5 °F.	24 hours
SR 3.7.2.3	----------NOTE---------- Isolation of flow to individual components does not render SW System inoperable. ---------- Verify each SW System manual, power operated, and automatic valve in the flow paths servicing safety related systems or components, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.7.2.4	----------NOTES---------- 1. A single test at the specified Frequency will satisfy this Surveillance for both units. 2. Isolation of flow to individual components does not render SW System inoperable. ---------- Verify automatic transfer of each DG cooling water supply from the normal SW supply to the alternate SW supply on low DG jacket cooling water supply pressure.	92 days

(continued)

ENCLOSURE 5

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 AND 50-324/LICENSE NOS. DPR-71 AND DPR-62
SUPPLEMENT TO REQUEST FOR LICENSE AMENDMENTS (TSC 00TSC04)
ULTIMATE HEAT SINK TEMPERATURE
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Marked-up Technical Specification Pages - Unit No. 2

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
G. One required NSW pump inoperable. AND Two required CSW pumps inoperable.	G.1	Verify by administrative means that two Unit 2 NSW pumps are OPERABLE.	Immediately
	AND		
	G.2.1	Restore required NSW pump to OPERABLE status.	72 hours
	OR		
	G.2.2	Restore one required CSW pump to OPERABLE status.	72 hours
H. Water temperature of the UHS > 89°F and ≤ 92°F.	H.1	Verify water temperature of the UHS is ≤ 89°F averaged over previous 24 hour period.	Once per hour

90.5

90.5

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	Verify the water level in the SW pump suction bay of the intake structure is ≥ -6 ft mean sea level.	24 hours
SR 3.7.2.2	Verify the water temperature of UHS is ≤ 89°F. 90.5	24 hours
SR 3.7.2.3	----------NOTE---------- Isolation of flow to individual components does not render SW System inoperable. ---------- Verify each SW System manual, power operated, and automatic valve in the flow paths servicing safety related systems or components, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.7.2.4	----------NOTES---------- 1. A single test at the specified Frequency will satisfy this Surveillance for both units. 2. Isolation of flow to individual components does not render SW System inoperable. ---------- Verify automatic transfer of each DG cooling water supply from the normal SW supply to the alternate SW supply on low DG jacket cooling water supply pressure.	92 days

(continued)

ENCLOSURE 6

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 AND 50-324/LICENSE NOS. DPR-71 AND DPR-62
SUPPLEMENT TO REQUEST FOR LICENSE AMENDMENTS (TSC 00TSC04)
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Marked-up Bases Pages - Unit No. 1 (For Information Only)

BASES

APPLICABLE SAFETY ANALYSES (continued)

evaluation of the long term primary containment response after a design basis LOCA.

The ability of the SW System to provide adequate cooling to the identified safety equipment is an implicit assumption for the safety analyses evaluated in References 1 and 2. During the first 10 minutes of a design basis LOCA, the ability to provide onsite emergency AC power is dependent on the ability of the SW System to cool the DGs. Ten minutes following a LOCA, the long term cooling capability of the RHR, core spray, and RHRSW subsystems is dependent on the cooling provided by the SW System.

The SW System, together with the UHS, satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii) (Ref. 4).

LCO

In the event of a DBA, the NSW header and associated components are adequate to provide the minimum heat removal capability assumed in the safety analysis for the systems to which it supplies cooling water. However, the CSW header and associated components are required to ensure maximum reliability in the event of a single failure. To ensure this requirement is met, the appropriate equipment to supply the unit NSW and CSW headers must be OPERABLE. In addition, at least three site NSW pumps are required to ensure adequate NSW pump redundancy is available to ensure cooling to the DGs in the event of an active single failure.

The SW System is considered OPERABLE when it has two OPERABLE CSW pumps, three site NSW pumps (any combination of Unit 1 and Unit 2 NSW pumps), and an OPERABLE flow path capable of taking suction from the intake structure and transferring the water to the ECCS equipment and the DGs. In addition, for a site NSW pump to be considered OPERABLE, it must be capable of supplying its associated unit NSW header. For a CSW pump to be considered OPERABLE, it must be capable of supplying the CSW header and the NSW header.

The OPERABILITY of the UHS is based on having a minimum water level in the pump well of the intake structure of -6 ft mean sea level and a maximum water temperature of 90.5 ~~89~~°F.

The isolation of the SW System to components or systems may render those components or systems inoperable, but does not affect the OPERABILITY of the SW System.

(continued)

BASES

ACTIONS

G.1, G.2.1, and G.2.2 (continued)

remaining OPERABLE SW pumps. However, the overall SW System reliability is significantly reduced because of the reduction in SW pump redundancy and operational diversity such that the SW System may not be able to perform its required support function. Therefore, a more restrictive Completion Time of 72 hours is required to restore at least one required CSW pump or the required NSW pump to OPERABLE status.

H.1

With water temperature of the UHS > 89°F and ≤ 92°F, the design basis assumption associated with initial UHS temperature are bounded provided the temperature of the UHS averaged over the previous 24 hour period is ≤ 89°F. With the water temperature of the UHS > 89°F, long term cooling capability of the ECCS loads and DGs may be affected. Therefore, to ensure long term cooling capability is provided to the ECCS loads when water temperature of the UHS is > 89°F, Required Action H.1 is provided to more frequently monitor the water temperature of the UHS and verify the temperature is ≤ 89°F when averaged over the previous 24 hour period. The once per hour Completion Time takes into consideration UHS temperature variations and the increased monitoring frequency needed to ensure design basis assumptions are not exceeded in this condition. If the water temperature of the UHS exceeds 89°F when averaged over the previous 24 hour period or the water temperature of the UHS exceeds 92°F, Condition I must be entered immediately.

90.5 90.5 90.5 90.5 90.5

I.1 and I.2

If Required Actions cannot be completed within the associated Completion Time of Condition A, B, D, E, F, G, and H; Required Action C.2 cannot be completed within the associated Completion Time; two or more required NSW pumps are inoperable; the SW System is inoperable for reasons other than Conditions A, B, C, D, E, F, and G; or the UHS is inoperable for reasons other than Condition H (e.g., low water level); the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must

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