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PSEG Nuclear LLC

10 CFR 50.90

May 7, 2021
LR-N21-0025
LAR H21-01

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

Hope Creek Generating Station
Renewed Facility Operating License Nos. NPF-57
NRC Docket No. 50-354

Subject: **License Amendment Request to Revise Technical Specification Limits for Ultimate Heat Sink**

In accordance with the provisions of 10 CFR 50.90, PSEG Nuclear LLC (PSEG) is submitting a request for an amendment to the Technical Specifications (TS) for Hope Creek Generating Station (HCGS).

The proposed change will revise the Hope Creek Generating Station (HCGS) Technical Specification (TS) 3/4.7.1.3, Ultimate Heat Sink (UHS), to modify the Limiting Condition for Operation (LCO) river temperature, increase the temperature in the action statement for opening the emergency discharge valves, add a new 72 hour allowed outage time for one Station Service Water System (SSWS) pump or one Safety Auxiliary Cooling System (SACS) pump or one Emergency Diesel Generator (EDG) inoperable with UHS temperature above 88°F, and revise the UHS average temperature limit and maximum temperature. In addition, the river temperature in Surveillance Requirement (SR) 4.7.1.3.b is being increased.

The Enclosure provides a description and assessment of the proposed changes. Attachment 1 provides the existing TS pages marked up to show the proposed changes. Attachment 2 provides the existing TS Bases marked up to show the associated TS Bases changes and is provided for information only.

PSEG requests approval of this license amendment request (LAR) in accordance with standard NRC approval process and schedule. Once approved, the amendment will be implemented within 60 days from the date of issuance.

In accordance with 10 CFR 50.91, a copy of this application, with attachments, is being provided to the designated State of New Jersey Official.

There are no regulatory commitments contained in this letter.

If you have any questions or require additional information, please contact Mr. Brian Thomas at 856-339-2022.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 5/7/2021
(Date)

Respectfully,

Edward T. Casulli
Site Vice President
Hope Creek Generating Station

Enclosure: Evaluation of the Proposed Changes
Attachment 1: Mark-up of Proposed Technical Specification Pages
Attachment 2: Mark-up of Proposed Technical Specification Bases Pages

cc: Administrator, Region I, NRC
Project Manager, NRC
NRC Senior Resident Inspector, Hope Creek
Ms. A. Pfaff, Manager, NJBNE
PSEG Corporate Commitment Tracking Coordinator
Site Commitment Tracking Coordinator

Enclosure

Evaluation of the Proposed Changes

Table of Contents

ATTACHMENTS:

1. Mark-up of Proposed Technical Specification Pages
2. Mark-up of Proposed Technical Specification Bases Pages

1.0 SUMMARY DESCRIPTION

The proposed change will revise the Hope Creek Generating Station (HCGS) Technical Specification (TS) 3/4.7.1.3, Ultimate Heat Sink (UHS), to modify the Limiting Condition for Operation (LCO) river temperature, increase the temperature in the action statement for opening the emergency discharge valves, add a new 72 hour allowed outage time for one Station Service Water System (SSWS) pump or one Safety Auxiliary Cooling System (SACS) pump or one Emergency Diesel Generator (EDG) inoperable with UHS temperature above 88°F, and revise the UHS average temperature limit and maximum temperature. In addition, the river temperature in Surveillance Requirement (SR) 4.7.1.3.b is being increased.

2.0 DETAILED DESCRIPTION

2.1 System Design and Operation

The UHS for Hope Creek is the Delaware River. The Station Service Water System (SSWS) is a safety related, open loop system, which provides cooling water to safety related heat exchangers and non-safety related heat exchangers during normal operating conditions and loss of offsite power (LOP). During a loss of coolant accident (LOCA) and other design basis accidents (DBA), the SSWS provides river water to cool only the safety related heat exchangers.

The Safety and Turbine Auxiliaries Cooling System (STACS) is a closed loop cooling water system consisting of two subsystems: a Safety Auxiliaries Cooling System (SACS) and a Turbine Auxiliaries Cooling System (TACS). The heat from both systems is transferred to the SSWS via the SACS heat exchangers. The non-safety related TACS portion of the system is isolated following a LOP and/or LOCA scenario.

SACS provides cooling water to the engineered safety features (ESF) equipment, including the residual heat removal (RHR) heat exchanger, during normal operation, normal plant shutdown, LOP, and LOCA conditions. TACS is designed to provide cooling water to the turbine auxiliary equipment during normal plant operation and normal plant shutdown.

The two principal safety functions of the UHS are the dissipation of residual heat after reactor shutdown, and dissipation of residual heat after an accident. The UHS temperature limit is established such that design basis temperatures of safety related equipment would not be exceeded.

Hope Creek TS Amendment 106 (Reference 1) revised TS 3.7.1.3 to raise the minimum allowable UHS water level to 80 feet and lowered the maximum allowable UHS temperature in the LCO to 85°F. In addition the action of TS 3.7.1.3 was revised to allow continued operation above 85°F, up to 87°F, provided that both emergency overboard discharge valves are open with the pathways available and all SSWS pumps are operable, all SACS pumps are operable, and all EDGs are operable. These changes were the result of reanalysis performed to address deficiencies identified in Licensee Event Report (LER) 96-015-00 (dated May 10, 1996). In this LER, a loss of the normal SSWS flow path (discharge to the cooling tower) could be lost and discharge would have to be through the overboard discharge path. The original calculations did not adequately take into account the hydraulic losses in the overboard discharge path. The

revised calculation determined that the most limiting post-accident UHS temperature was 85°F with failure of an emergency discharge (EOB) valve with consequential loss of an EOB discharge flow path. This calculation also determined that indefinite operation up to a UHS temperature of 87°F was acceptable provided the EOB discharge valves were open, and all SSWS and SACS pumps, and EDGs were operable. Below 87°F, the reanalysis supported the longer 30-day allowed outage times of the SACS TS 3.7.1.1 and SSWS TS 3.7.1.2. These longer AOTs were based on having a SACS or SSWS pump out of service and having the capability to withstand an additional pump failure in the same system. In addition, operation up to a UHS temperature of 87°F requires that SACS be operated with no cross-connected loads other than those loads that are automatically isolated under post-accident conditions. This reanalysis assured a maximum SACS heat exchanger discharge temperature of 95°F.

Hope Creek TS Amendment 120 (Reference 2) increased the UHS temperature limits approved in TS Amendment 106. The increase in UHS temperatures was the result of increasing the post-accident SACS temperature from 95°F to 100°F. For the increase in the SACS temperature design limit, PSEG evaluated the environmental qualification of equipment cooled by SACS or located in rooms cooled by SACS; evaluated the effect on piping stresses; and assessed the capability of components and systems to perform their post-accident safety related functions under worst case design basis conditions. In order to maintain the capability of the UHS to mitigate the consequences of design basis accidents and transients, Hope Creek maintained the plant configuration restrictions imposed by TS Amendment 106 but revised the temperature limits. The action to open both emergency overboard discharge valves was maintained at 85°F. The action to ensure all EDGs, SSWS pumps and SACS pump are operable was increased from 85°F to 88°F. The overall UHS temperature for continued plant operation was increased from 87°F to 89°F. These limits included an instrument uncertainty of 1.3 degrees.

Hope Creek TS Amendment 168 (Reference 3) added UHS temperature averaging in accordance with TSTF-330. The TS LCO limit on river water temperature was maintained but changes were made to the TS actions to allow for temporary fluctuations in temperature provided that the average over the previous 24-hour period does not exceed 89°F and the UHS temperature does not exceed 91.4°F. This change did not alter any assumptions on which the current plant safety analysis is based. These temperatures were based on Hope Creek calculation EG-0047 provided to the NRC via PSEG letter LR-N06-0346 dated August 1, 2006 (Reference 4).

2.2 Current Technical Specification Requirements

The current HCGS TS limiting condition for operation (LCO) for ultimate heat sink is as follows:

3.7.1.3 The ultimate heat sink (Delaware River) shall be OPERABLE with:

a. A minimum river water level at or above elevation -9'0 Mean Sea Level, USGS datum (80'0 PSE&G datum), and

b. An average river water temperature of less than or equal to 85.0°F.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3, 4, 5 and *.

ACTION:

With the river water temperature in excess of 85.0°F, continued plant operation is permitted provided that both emergency discharge valves are open and emergency discharge pathways are available. With the river water temperature in excess of 88.0°F, continued plant operation is permitted provided that all of the following additional conditions are satisfied: all SSWS pumps are OPERABLE, all SACS pumps are OPERABLE, all EDGs are OPERABLE and the SACS loops have no cross-connected loads (unless they are automatically isolated during a LOP and/or LOCA); with ultimate heat sink temperature greater than 89°F and less than or equal to 91.4ºF, verify once per hour that water temperature of the ultimate heat sink is less than or equal to 89ºF averaged over the previous 24 hour period; otherwise, with the requirements of the above specification not satisfied:

a. In OPERATIONAL CONDITIONS 1, 2 or 3, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.

b. In OPERATIONAL CONDITIONS 4 or 5, declare the SACS system and the station service water system inoperable and take the ACTION required by Specification 3.7.1.1 and 3.7.1.2.

c. In Operational Condition *, declare the plant service water system inoperable and take the ACTION required by Specification 3.7.1.2. The provisions of Specification 3.0.3 are not applicable.

* When handling recently irradiated fuel in the secondary containment.

2.3 Reason for Proposed Change

During the summer of 2020, the UHS temperature exceeded 88ºF for several periods requiring entry into Condition ‘H’ of HC.OP-AB.COOL-0001 to ensure that all EDGs, SACS pumps and SSWS pumps remain operable. Inoperability and any one of these components would have required entry into action ‘a’ of TS 3.7.1.3. Several of the time periods that Hope Creek remained above 88ºF would have required a plant shutdown if an EDG or SSWS pump or SACS pump had already been inoperable or would have become inoperable when the river temperature exceeded 88ºF. The proposed change would revise the action of TS 3.7.1.3 to

allow 72 hours to restore an inoperable EDG, or SACS pump or SSWS pump to OPERABLE status while above 88ºF to avoid unnecessary plant shutdowns. Also during the summer of 2020, the UHS temperature exceeded 89ºF for 3 time periods requiring entry into Condition 'I' of HC.OP-AB.COOL-0001. The proposed change would increase this temperature limit to avoid having to submit a request for Notice of Enforcement Discretion (NOED) when continued plant operation is supported by the current design basis.

2.4 Description of Proposed Change

TS 3.7.1.3 will be revised as follows:

- LCO 3.7.1.3.b entry temperature will be increased from 85.0°F to 88.0°F
- The temperature to perform the action to open both emergency discharge pathways will be increased from 85.0°F to 88.0°F
- The action to ensure that all SSWS pumps are OPERABLE, all SACS pumps are OPERABLE, all EDGs are OPERABLE and the SACS loops have no cross-connected loads (unless they are automatically isolated during a LOP and/or LOCA) when river temperature is above 88.0°F will be replaced with a new 72 hour allowed outage time for one SSWS pump or one SACS pump or one EDG inoperable when river temperature is above 88.0°F.
- The action statement temperature for performance of UHS temperature averaging will be increased from 89ºF to 91.0°F with the maximum temperature limit being increased from 91.4ºF to 93.0ºF.
- SR 4.7.1.3.b is being revised to increase the temperature from 82ºF to 85ºF.

The actual marked-up TS pages are provided in Attachment 1. TS Bases mark ups are provided in Attachment 2 to show the associated TS Bases changes and are provided for information only.

3.0 TECHNICAL EVALUATION

The proposed technical specification changes are based on calculation EG-0047. Calculation EG-0047 supported the current limits contained in the Hope Creek TS as approved by the NRC in Amendment 168. PSEG has reassessed the margins contained in EG-0047 and is proposing changes to the UHS temperature limits as discussed in detail below. The proposed UHS limits maintain the current instrument uncertainty allowance of 1.3 degrees. The proposed changes to the UHS temperature limits do not impact the containment analysis and maintain the post-accident SACS outlet temperature of 100 ºF consistent with Amendment 120.

3.1 Increase in UHS Temperature Limits

The temperature limit contained in LCO 3.7.1.3.b will be increased from 85ºF to 88ºF. The current temperature limit of 85ºF is aligned with the first action statement requirement of TS 3.7.1.3 which allows continued operation above this temperature provided that both emergency discharge valves are open and emergency discharge paths are available. This action was added to TS 3.7.1.3 in Amendment 106 (Reference 1).

The action to open both emergency discharge (EOB) valves eliminates the need to assume a random failure of an emergency discharge flow path. The emergency discharge flow path is the assumed discharge flow path of the service water system in the unlikely event the normal, non-

seismic flow path (discharge to the cooling tower basin) is unavailable during either the LOCA or LOP event. The postulation of a seismic event in conjunction with either a LOCA or LOP has been part of the UHS analysis since Amendment 106 and remains unchanged. Based on the current EG-0047 calculation, a random single failure of an emergency discharge flow path can be accommodated up to 88ºF with some margin as shown in Table 1. Therefore, the temperature to perform the action to ensure that both emergency discharge valves are open and the emergency discharge paths are available is being increased to 88ºF.

Table 1 - Limiting Design Basis Cases and Proposed UHS Limits

Design Basis Event	Proposed Tech Spec Limit	Limit / Margin w/Uncertainty	Limit / Margin w/o Uncertainty	EG-0047 Case, Rev. 8
EOB Failure	88°F	88.9°F / 0.9°F	90.2°F / 2.2°F	38
AOT Case Limit	88°F	88.2°F / 0.2°F	89.5°F / 1.5°F	33
LOCA/SSE/EDG Failure	91°F	91.3°F / 0.3°F	92.6°F / 1.6°F	35
LOP/SSE/EDG Failure	91°F	91.4°F / 0.4°F	92.7°F / 1.7°F *	37

*Note: Actual margin is 0.1°F higher since the instrument uncertainty for LOP event is 1.2°F versus 1.3°F for a LOCA. 1.3°F is used in the calculation for both to be conservative.

Currently SACS TS 3.7.1.1 actions a.1.b (for one SACS heat exchanger inoperable), a.2 (for one SACS subsystem otherwise inoperable), a.3.a (for one SACS pump in each subsystem inoperable) and SSWS TS 3.7.1.2 actions a.2 (for one SSWS pump in each loop inoperable) and a.3 (for one SSWS loop otherwise inoperable), contain the statement “if continued plant operation is permitted by LCO 3.7.1.3.” This statement was added to these action statements in Amendment 106 (Reference 1). Continued plant operation in these actions is permitted up to 88°F (see Table 1 AOT Case Limit). With the proposed change to increase the LCO temperature from 85.0°F to 88.0°F, if the UHS temperature were to exceed 88.0°F while in the SACS or SSWS TS actions identified above, Action a of TS 3.7.1.3 would be entered requiring the plant to be in HOT SHUTDOWN within 12 hours. The completion time of the above SACS or SSWS TS actions will run in conjunction with the shutdown action of TS 3.7.1.3. This clarification is added to the TS bases (see Attachment 2).

Amendment 106 (Reference 1) also added the action to TS 3.7.1.3 to ensure the SACS loops have no cross-connected loads (unless they are automatically isolated during a LOP and/or LOCA). The action to cross connect loads for the SACS system is directed by TS 3.7.1.1 action a.2 (for one SACS subsystem otherwise inoperable) and is permitted when the UHS does not exceed 88.0°F. As discussed above, if the UHS temperature were to exceed 88.0°F while in this SACS TS action, Action ‘a’ of TS 3.7.1.3 would be entered requiring the plant to be in HOT SHUTDOWN within 12 hours. Therefore retaining the action in TS 3.7.1.3 to ensure the SACS loops have no cross-connected loads is no longer necessary and is being removed.

TSTF-330 Temperature Averaging:

In Amendment 168 (Reference 3), the allowance for temperature fluctuations over a period of 24 hours was added to TS 3.7.1.3 with a temperature average of 89 ºF and overall limit of 91.4ºF in accordance with TSTF-330. The proposed change will increase the temperature average to 91.0ºF with an overall equipment temperature limit of 93.0ºF.

The current UHS analysis demonstrates that the maximum allowable UHS temperature to maintain the SACS header below its design basis post-accident temperature of 100ºF for the limiting design basis event (LOP or LOCA with a safe shutdown earthquake (SSE)) is 91.3 ºF including measurement uncertainty (see Table 1). A temperature of 91.0ºF is incorporated into the TS 3.7.1.3 temperature average to retain some margin.

Where components rely upon the UHS temperature to maintain the components within operating temperature limits, engineering evaluation (Reference 7) determined that the components could withstand service water temperatures up to 95.0ºF. The following component design limits were reviewed:

- Traveling Water Screens
- Spray Wash Booster Pumps
- Service Water Pumps
- Service Water Pump Lubrication
- Service Water Strainers
- SACS Heat Exchangers
- RACS Heat Exchangers

Although this engineering evaluation assessed the UHS temperature up to 95ºF, the proposed maximum limit is being set at 93.0ºF.

While the SACS supplied safety-related components are designed for a maximum inlet temperature of 100°F, non-safety related TACS components which are required to support normal operation and normal shutdown rely upon a maximum allowable SACS temperature of 95°F (power generation design) which is not being changed. Operating procedures identify the maximum allowable SACS temperature as 95°F during normal power operations. Abnormal Operating Procedure HC.OP-AB.COOL-0002 provides guidance if the SACS temperature cannot be maintained below 95°F including reducing power operation. Depending on plant conditions, some level of station down-power may be necessary at a sustained 91°F average UHS temperature or during 93°F short-duration peaks. The existing SACS temperature limits are not changed by this proposed technical specification change.

TSTF-330 revision 3 provides the following criteria as the basis for adopting the UHS temperature averaging approach:

A. The UHS is not relied upon for immediate heat removal (such as to prevent containment over pressurization), but is relied upon for longer term cooling such that the averaging approach continues to satisfy the accident analysis assumptions for heat removal over time.

   Response: The UHS is not immediately relied upon to provide post-accident primary containment heat removal. The suppression pool serves this function and its initial temperature is independent of the UHS temperature.

   Long-term heat removal is achieved through the use of the containment spray and/or suppression pool cooling modes of the RHR system. The design basis heat removal capability of the RHR heat exchanges, assumed in the accident analyses, has been evaluated and is maintained for a continuous UHS temperature up to 91.3 ºF.

The EDGs rely on the UHS (via SACS) to immediately remove heat from the engine cylinder jackets, turbocharger, combustion air, generator outboard bearings, speed governor oil, and the lubricating oil. As discussed above, the SACS heat exchanger outlet temperature of 100ºF is maintained for continuous UHS temperatures up to 91.3ºF.

The drywell coolers are non-safety related and, therefore, are not relied upon in the plant safety analysis for post accident heat removal.

B. When the UHS is at the proposed maximum allowed value of [93.0 ºF], equipment that is relied upon for accident mitigation, anticipated operational occurrences or for safe shutdown, will not be adversely affected and are not placed in alarm condition or limited in any way at this higher temperature.

Response: The equipment, previously listed above, that is relied upon for accident mitigation, anticipated operational occurrences, or for safe shutdown remains capable of performing its design basis function at UHS temperatures up to 93 ºF.

C. Plant specific assumptions, such as those that were credited in addressing station blackout and Generic Letter 96-06 have been adjusted as necessary to be consistent with the maximum allowed UHS temperature of [93 ºF] that is proposed.

Response: A review of the Generic Letter (GL) 96-06 evaluations has determined that the evaluations are not impacted by the proposed UHS temperature limit. The maximum SACS water temperature assumed in the UHS analysis during normal operation remains unchanged and ensures maximum suppression pool temperature of 95°F used in accident analysis and station blackout. The impact of the increased UHS temperature limit on events that the plant must be designed to withstand is encompassed by the previous evaluations which demonstrate that the safety related equipment which relies on the UHS for cooling remains capable of performing its design basis function at UHS temperature up to 93ºF. Therefore, plant specific assumptions previously credited in evaluating events and regulatory issues are not impacted by the increase in the UHS temperature limit.

D. Cooling water that is being discharged from the plant (either during normal plant operation, or during accident conditions), does not affect the UHS intake temperature (typical of an infinite heat sink), but location of the intake and discharge connections, and characteristics of the UHS can have an impact.

Response: The UHS for Hope Creek is the Delaware River. Between the months of June and August, Hope Creek is required to limit the temperature rise in the river to 1.5 ºF at the end of the mixing zone. Hope Creek is designed such that there is separation between the intake and outtake of the Salem and Hope Creek Stations. Specifically, the mixing zone is 2500 feet up river, 2500 feet down river and 1500 feet offshore. The Hope Creek service water intake structure is about 1500 feet south of the cooling tower discharge pipe or outfall. As noted in the NRC's Final Environmental Statement (FES) for Hope Creek Operating License (Reference 6), the large tidal influence dilutes, mixes, and rapidly dissipates the thermal discharges from Hope Creek. During an accident, the unit would shut down and the heat input from the circulating water system would be greatly reduced.

3.2 Add action for inoperable EDG, SACS pump, SSWS Pump and eliminate requirement for all EDGs, SACS pumps and SSWS pumps to be operable with UHS temperature greater than 88ºF

The current action to ensure that all EDGs, SACS pumps and SSWS pumps are operable above 88ºF is proposed to be replaced with a new action that will allow either one SSWS pump or one SACS pump or one EDG to be inoperable for a period of 72 hours. This 72 hour allowed outage time would be allowed when UHS temperature exceeds 88 ºF.

Below 88ºF, the EG-0047 calculation supports the longer 30-day allowed outage times of the SACS TS 3.7.1.1 and SSWS TS 3.7.1.2. These longer AOTs were based on having a SACS or SSWS pump out of service and having the capability to withstand an additional pump failure in the same system. Above this temperature this additional failure assumption could not be maintained so the restriction was added to TS 3.7.1.3 (originally added in Amendment 120) to ensure that all EDGs, SACS pumps and SSWS pumps were operable. However, this TS restriction was overly conservative since the EG-0047 calculation evaluates the UHS temperature above 88 ºF with the consideration of the worst random single failure being a failure an EDG. Failure of an EDG will also cause loss of power to the respective SACS and SSWS pump powered from this same bus since offsite power is also assumed to be lost. The case of a single EDG failure with a LOCA/SSE is the case that determined the UHS maximum temperature limit of 91.3ºF (see Table 1).

Although the EG-0047 calculation does not support the extended 30 day AOTs of TS 3.7.1.1 and 3.7.1.2 above UHS temperature of 88 F, it would be appropriate to allow a shortened AOT of 72 hours for a single EDG, SSWs pump, or SACS pump since this configuration is consistent with the configuration evaluated in EG-0047. The 72-hour time frame is consistent with other design basis mitigation components including TS 3.8.1.1 Action b.2.a for the emergency diesel generators and the low likelihood of a design basis accident occurring during this period of time.

Restricting the plant configuration to ensure that all EDGs, SACS pumps and SSWS pumps are operable above 88ºF would be appropriate if the restriction was placed in the LCO section of TS 3.7.1.3 since a random single failure would need to be considered with this minimum complement of equipment. However, the restriction was placed in the action of TS 3.7.1.3. In accordance with the guidance of ANSI/ANS 58.9-1981, “Single Failure Criteria for Light Water Reactor Safety-Related Fluid Systems,” an additional random single failure does not need to be assumed in the other train if the configuration is allowed by the Technical Specification actions. Allowing either one SSWS pump or one SACS pump or one EDG inoperable (or a combination of EDG and pumps powered from a single train) for a limited period of 72 hours is consistent with the assumptions of calculation EG-0047 provided an additional random single failure is not postulated while in the TS action.

The addition of the 72-hour action in TS 3.7.1.3 is not intended to extend the action times of TS 3.7.1.1 Action a.1.a, 3.7.1.2 Action a.1 or 3.8.1.1 Actions b.2 and b.3 for an inoperable SACS pump, SSWS pump or EDG. If a SACS pump, or SSWS pump or EDG is inoperable prior to river temperature increasing above 88ºF, the action time limits of TS 3.7.1.1, 3.7.1.2 or 3.8.1.1 continue from the initial entry of these actions. This clarification is added to the TS bases (see Attachment 2).

3.3 Increase Temperature for Surveillance Requirement Performance

Surveillance requirement (SR) 4.7.1.3.b requires the verification of river temperature within limits. Currently SR 4.7.1.3.b.1 requires performance once per 24 hours in accordance with the surveillance frequency control program (SFCP) and 4.7.1.3.b.2 requires performance once per 2 hours in accordance with the SFCP when river temperature exceeds 82 ºF. With the LCO 3.7.1.3.b temperature being increased by 3ºF, the river temperature contained in SRs 4.7.1.3.b.1 and 4.7.1.3.b.2 is proposed to increase the same 3ºF amount to 85ºF. This increase in temperature will limit additional burden on the control room operators to take increased readings when temperature exceeds 82ºF and the first TS action is not required to be performed until 88ºF.

3.4 Conclusion

The addition of the allowed outage time for one SSWS pump or one SACS pump or one EDG inoperable with the UHS above 88ºF will continue to meet the minimum requirements for mitigation of a design basis accident (DBA). The increased UHS limits will continue to meet the required heat removal for the mitigation of DBAs.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

10 CFR 50.36(c) provides that TS will include Limiting Conditions for Operation (LCOs) which are “the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee will shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met.” The proposed changes maintain the minimum equipment capability of the UHS required to respond to a DBA. Therefore, the proposed changes are consistent with current regulations.

The following 10 CFR 50, Appendix A, General Design Criteria (GDC) apply to the systems covered by the proposed changes in this amendment application.

CRITERION 44 - COOLING WATER

"A system to transfer heat from structures, systems, and components important to safety, to an ultimate heat sink shall be provided. The system safety function shall be to transfer the combined heat load of these structures, systems, and components under normal operating and accident conditions. Suitable redundancy in components and features, and suitable interconnections, leak detection, and isolation capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure."

Following implementation of the proposed changes, HCGS will remain in compliance with GDC 44.

Hope Creek complies with Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Power Plants," Revision 2, as described in UFSAR Section 1.8.1.27. The proposed change maintains this compliance.

4.2 Precedents

The following Technical Specification amendments involved the incorporation of TSTF-330 for adoption of UHS temperature averaging.

- Brunswick Unit 1 and 2 Amendments 213 and 240 – April 20, 2001
- Millstone Unit 2 Amendment 257 – May 31, 2001
- Nine Mile Point Unit 2 Amendment 113 – May 7, 2004
- Peach Bottom Unit 2 and 3 Amendments 244/248 – July 29, 2002
- Hope Creek Amendment 168 - August 1, 2006

4.3 No Significant Hazards Consideration

PSEG requests an amendment to the Hope Creek Operating License. The proposed change will revise the Hope Creek Generating Station (HCGS) Technical Specification (TS) 3/4.7.1.3, Ultimate Heat Sink, to modify the Limiting Condition for Operation (LCO) river temperature, increase the temperature in the action statement for opening the emergency discharge valves, add a new 72 hour allowed outage time for one Station Service Water System (SSWS) pump or one Safety Auxiliary Cooling System (SACS) pump or one Emergency Diesel Generator (EDG) inoperable with UHS temperature above 88°F, and revise the UHS average temperature and maximum temperature. In addition, the river temperature to perform Surveillance Requirement (SR) 4.7.1.3.b is being increased.

PSEG has evaluated the proposed changes to the TS using the criteria in 10 CFR 50.92, and determined that the proposed changes do not involve a significant hazards consideration. The following information is provided to support a finding of no significant hazards:

1. Do the proposed changes involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The ultimate heat sink (UHS) is not an accident initiator. The proposed TS changes related to the UHS involve no hardware changes and no changes to existing structures, systems or components. The UHS and supported system temperature and configuration limits ensure that the UHS can remove required heat loads during design basis accidents and transients with the proposed UHS river water temperature limits. The proposed UHS TS ACTION statements ensure that the plant is directed to enter a safe shutdown condition whenever the capability to mitigate design basis accidents and transients is lost. The UHS will still remain capable of meeting all applicable design basis requirements and maintains the capability to mitigate the consequences of accidents described in the HC UFSAR. As a result, these changes will not increase the probability of an accident previously evaluated nor significantly increase the consequences of an accident previously evaluated.

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

2. Do the proposed changes create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed TS changes to UHS TS will not create the possibility of a different type of accident. The proposed changes do not result in any hardware changes to any structures, systems or components in the plant and hence does not create any new accident initiators.

Since the proposed changes do not create any additional accident initiators for the plant, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Do the proposed changes involve a significant reduction in a margin of safety?

Response: No.

The proposed changes to the UHS TS ensure continued capability of the UHS to mitigate consequences of design basis accidents and transients. The UHS supported system's configuration limits and changes to the operating limits of the UHS ensure that the UHS can remove required heat loads during design basis accidents and transients with the proposed river water temperature limits. Since the UHS will still remain capable of meeting all applicable design basis requirements and maintain the capability to mitigate the consequences of accidents described in the HC UFSAR, the proposed changes were determined to not result in a significant reduction in a margin of safety.

Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

Based upon the above, PSEG concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

4.4 Conclusion

Therefore, 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

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined

in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

1. NRC letter to PSEG, Amendment 106 (ADAMS Accession No. 9711180316)
2. NRC letter to PSEG, Amendment 120 (ADAMS Accession No. 9904230353)
3. NRC letter to PSEG, Amendment 168 (ADAMS Accession No. ML062130012)
4. PSEG Letter LR-N06-0346 to NRC, “Supplement to Request for License Amendment Ultimate Heat Sink,” dated August 1, 2006 (ADAMS Accession No. ML062210235)
5. TSTF-330, “Ultimate Heat Sink.”
6. NUREG-1074, “Final Environmental Statement Related to the Operation of the Hope Creek Generating Station, “ December 1984
7. H-1-EA-MEE-1926, Rev. 0, “Average Ultimate Heat Sink Temperature”
8. EG-0047, Rev 8, “HCGS Ultimate Heat Sink Temperature Limits – EPU”
9. HC.OP-AB.COOL-0001, “Station Service Water”
10. HC.OP-AB.COOL-0002, “Safety/Turbine Auxiliaries Cooling System”

Attachment 1

Mark-up of Proposed Technical Specification Pages

The following Technical Specifications pages for Renewed Facility Operating License NPF-57 are affected by this change request:

Technical Specification	**Page**
3.7.1.3, Ultimate Heat Sink	3/4 7-5

PLANT SYSTEMS

ULTIMATE HEAT SINK

LIMITING CONDITION FOR OPERATION

3.7.1.3 The ultimate heat sink (Delaware River) shall be OPERABLE with:

a. A minimum river water level at or above elevation -9'0 Mean Sea Level, USGS datum (80'0 PSE&G datum), and

88.0

b. An average river water temperature of less than or equal to ~~85.0~~°F.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3, 4, 5 and *.

ACTION: Insert

~~With the river water temperature in excess of 85.0°F, continued plant operation is permitted provided that both emergency discharge valves are open and emergency discharge pathways are available. With the river water temperature in excess of 88.0°F, continued plant operation is permitted provided that all of the following additional conditions are satisfied: all SSWS pumps are OPERABLE, all SACS pumps are OPERABLE, all EDGs are OPERABLE and the SACS loops have no cross-connected loads (unless they are automatically isolated during a LOP and/or LOCA); with ultimate heat sink temperature greater than 89°F and less than or equal to 91.4ºF, verify once per hour that water temperature of the ultimate heat sink is less than or equal to 89ºF averaged over the previous 24 hour period; otherwise, with the requirements of the above specification not satisfied:~~

a. In OPERATIONAL CONDITIONS 1, 2 or 3, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.

b. In OPERATIONAL CONDITIONS 4 or 5, declare the SACS system and the station service water system inoperable and take the ACTION required by Specification 3.7.1.1 and 3.7.1.2.

c. In Operational Condition *, declare the plant service water system inoperable and take the ACTION required by Specification 3.7.1.2. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.1.3 The ultimate heat sink shall be determined OPERABLE:

a. By verifying the river water level to be greater than or equal to the minimum limit in accordance with the Surveillance Frequency Control Program.

b. By verifying river water temperature to be within its limit:

1) in accordance with the Surveillance Frequency Control Program when the river water temperature is less than or equal to ~~82~~°F.

85

2) in accordance with the Surveillance Frequency Control Program when the river water temperature is greater than ~~82~~°F.

* When handling recently irradiated fuel in the secondary containment.

Insert

With the river water temperature in excess of 88.0°F, continued plant operation is permitted provided that:

- both emergency discharge valves are open and emergency discharge pathways are available;
- with one SSWS pump or one SACS pump or one EDG inoperable, restore the inoperable SACS pump or SSWS pump or EDG within 72 hours;
- with ultimate heat sink temperature greater than 91.0°F and less than or equal to 93.0ºF, verify once per hour that water temperature of the ultimate heat sink is less than or equal to 91.0ºF averaged over the previous 24 hour period;

Otherwise, with the requirements of the above specification not satisfied:

Attachment 2

Bases Page Markups – For Information Only

The following Technical Specifications Bases pages for Renewed Facility Operating License NPF-57 are affected by this change request:

Technical Specification	Page
3.7.1.3, Ultimate Heat Sink	3/4 7-1

3/4.7.1 SERVICE WATER SYSTEMS

The OPERABILITY of the station service water and the safety auxiliaries cooling systems ensures that sufficient cooling capacity is available for continued operation of the SACS and its associated safety-related equipment during normal and accident conditions. The redundant cooling capacity of these systems, assuming a single failure, is consistent with the assumptions used in the accident conditions within acceptable limits.

Insert →

3/4.7.2 CONTROL ROOM SYSTEMS

3/4.7.2.1 CONTROL ROOM EMERGENCY FILTRATION SYSTEM

The OPERABILITY of the control room emergency filtration system ensures that the control room will remain habitable for occupants during and following all design basis accident conditions. Operation with the heaters on for ≥ 15 continuous minutes demonstrates OPERABILITY of the system. Periodic operation ensures that heater failure, blockage, fan or motor failure, or excessive vibration can be detected for corrective action. The Surveillance Frequency is controlled under the Surveillance Frequency Program. The OPERABILITY of this system in conjunction with control room design provisions is based on limiting the radiation exposure to personnel occupying the control room to 5 rem or less total effective dose equivalent (TEDE). This limitation is consistent with the requirements of 10 CFR Part 50.67, "Accident Source Term."

Due to radioactive decay, handling of fuel only requires OPERABILITY of CREF when fuel being handled is recently irradiated, i.e., fuel that has occupied part of the critical reactor core within the previous 24 hours. Each CREF subsystem is considered OPERABLE when the individual components necessary to limit Control Room Envelope occupant exposure are OPERABLE. A subsystem is considered OPERABLE when its associated:

a. Fans are OPERABLE (i.e., one CREF fan, one control room supply fan and one control room return air fan);

b. HEPA filter and charcoal adsorbers are not excessively restricting flow and are capable of performing their filtration functions, and

c. Heater, ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

The Control Room Envelope (CRE) is the area within the confines of the CRE boundary that contains the spaces that control room occupants inhabit to control the unit during normal and accident conditions. This area encompasses the control room, and other non-critical areas including adjacent support offices, toilet and utility rooms. The CRE is protected during normal operation, natural events, and accident conditions. The CRE boundary is the combination of walls, floor, ceiling, ducting, valves, doors, penetrations and equipment that physically form the CRE. The OPERABILITY of the CRE boundary must be maintained to ensure that the inleakage of unfiltered air into the CRE will not exceed the inleakage assumed in the licensing basis analysis of design basis accident (DBA) consequences to CRE occupants. The CRE and its boundary are defined in the Control Room Envelope Habitability Program.

In order for the CREFAS subsystems to be considered OPERABLE, the CRE boundary must be maintained such that the CRE occupant dose from a large radioactive release does not exceed the calculated dose in the licensing basis consequence analyses for DBAs, and that CRE occupants are protected from hazardous chemicals and smoke.

Insert (Bases 3/4.7.1):

TS 3.7.1.3 LCO allows continued plant operation above 88°F provided that the both emergency discharge (EOB) valves are open and the emergency discharge pathways are available and that only a single EDG, SACS pump or SSWS pump can be inoperable. The action to open both EOB valves eliminates the need to assume a random failure of an emergency discharge flow path. The emergency discharge flow path is the assumed discharge flow path of the service water system in the unlikely event the normal, non-seismic flow path (discharge to the cooling tower basin) is unavailable during either the LOCA or LOP event. The 30-day allowed outage times of the SACS TS 3.7.1.1 and SSWS TS 3.7.1.2 are based on having a SACS or SSWS pump out of service and having the capability to withstand an additional pump failure in the same system.

SACS TS 3.7.1.1 actions a.1.b (for one SACS heat exchanger inoperable), a.2 (for one SACS subsystem otherwise inoperable), a.3.a (for one SACS pump in each subsystem inoperable) and SSWS TS 3.7.1.2 actions a.2 (for one SSWS pump in each loop inoperable) and a.3 (for one SSWS loop otherwise inoperable), contain the statement "if continued plant operation is permitted by LCO 3.7.1.3." Continued plant operation in these actions is permitted up to a UHS temperature of 88.0°F (Calculation EG-0047). If the UHS temperature were to exceed 88.0°F while in the identified SACS or SSWS TS actions, Action a of TS 3.7.1.3 would be entered. The completion time of the above SACS or SSWS TS actions will run in conjunction with the shutdown action 'a' of TS 3.7.1.3. If the UHS temperature were to return below 88.0°F, TS 3.7.1.3 Action a would be exited; however, the allowed outage time of SACS TS 3.7.1.1 actions a.1.b, a.2, a.3.a and SSWS TS 3.7.1.2 actions a.2 and a.3 would continue from the initial entry time.

Above 88.0°F, TS 3.7.1.3 allows a single SACS pump or SSWS pump or EDG to be inoperable for a period of 72 hours. This 72 hour allowed outage time in TS 3.7.1.3 is not intended to extend the allowed outage times of TS 3.7.1.1 Action a.1.a, 3.7.1.2 Action a.1 or 3.8.1.1 Actions b.2 and b.3 for an inoperable SACS pump, SSWS pump or EDG. If a SACS pump, or SSWS pump or EDG is inoperable prior to river temperature increasing above 88ºF, the allowed outage time limits of TS 3.7.1.1, 3.7.1.2 or 3.8.1.1 continue from the initial entry of these actions. If the UHS temperature is above 88ºF and a SACS pump, or SSWS pump or EDG is declared inoperable, both the action of TS 3.7.1.3 and the action of either TS 3.7.1.1 Action 1.a, TS 3.7.1.2 Action a.1 or TS 3.8.1.1 Actions b.2 or b.3 are entered concurrently.

With water temperature of the UHS > 91°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 ≤ 91°F. With the water temperature of the UHS > 91°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 > 91°F, the action is to more frequently monitor the water temperature of the UHS and verify the temperature is ≤ 91°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 and equipment limitations are not exceeded in this condition. If the water temperature of the UHS exceeds 91°F when averaged over the previous 24 hour period or the water temperature of the UHS exceeds 93°F, the applicable Action must be entered immediately.