

August 1, 2006

Mr. William Levis  
Senior Vice President & Chief Nuclear Officer  
PSEG Nuclear LLC - N09  
Post Office Box 236  
Hancocks Bridge, NJ 08038

SUBJECT: HOPE CREEK GENERATING STATION - ISSUANCE OF AMENDMENT  
RE: ULTIMATE HEAT SINK (TAC NO. MC8054)

Dear Mr. Levis:

The Commission has issued the enclosed Amendment No. 168 to Facility Operating License No. NPF-57 for the Hope Creek Generating Station. This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated August 4, 2005, as supplemented by letters dated February 9, July 18, and August 1, 2006. The amendment revises TS 3.7.1.3, "Ultimate Heat Sink," to permit continued plant operation if the temperature of the ultimate heat sink (UHS) exceeds 89°F, provided the UHS temperature averaged over the previous 24-hour period is verified at least once per hour to be less than or equal to 89°F, and the UHS temperature does not exceed a maximum value of 91.4°F.

A copy of our Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

**/RA by R. Ennis for/**

Stewart N. Bailey, Senior Project Manager  
Plant Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-354

Enclosures:

1. Amendment No. 168 to License No. NPF-57
2. Safety Evaluation

cc w/encls: See next page

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Hope Creek Generating Station

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PSEG NUCLEAR LLC

DOCKET NO. 50-354

HOPE CREEK GENERATING STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 168  
License No. NPF-57

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment filed by PSEG Nuclear LLC dated August 4, 2005, as supplemented by letters dated February 9, July 18, and August 1, 2006, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-57 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 168, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated into the license. PSEG Nuclear LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. The license amendment is effective as of its date of issuance and shall be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION

***/RA/***

Brooke D. Poole, Acting Chief  
Plant Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance: August 1, 2006

ATTACHMENT TO LICENSE AMENDMENT NO. 168

FACILITY OPERATING LICENSE NO. NPF-57

DOCKET NO. 50-354

Replace the following page of the Appendix A Technical Specifications with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove  
3/4 7-5

Insert  
3/4 7-5

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 168 TO FACILITY OPERATING LICENSE NO. NPF-57

PSEG NUCLEAR LLC

HOPE CREEK GENERATING STATION

DOCKET NO. 50-354

1.0 INTRODUCTION

By letter dated August 4, 2005, as supplemented by letters dated February 9, July 18, and August 1, 2006, PSEG Nuclear LLC (PSEG or the licensee) submitted a request for changes to the Hope Creek Generating Station (Hope Creek) Technical Specifications (TSs). The proposed amendment would revise TS 3.7.1.3, "Ultimate Heat Sink," to permit continued plant operation if the temperature of the ultimate heat sink (UHS) exceeds 89°F, provided the UHS temperature averaged over the previous 24-hour period is verified at least once per hour to be less than or equal to 89°F, and the UHS temperature does not exceed a maximum value of 91.4°F.

The UHS for Hope Creek is the Delaware River. As discussed in the licensee's application dated August 4, 2005, during the summer of 2005, the UHS temperature for Hope Creek approached the current 89°F temperature limit in the TSs. A shutdown of the plant due to UHS high temperature would result in an unnecessary plant transient, and increase the possibility of a disturbance to the offsite electrical power sources and the regional electrical power distribution system at a time of potential grid vulnerability due to maximum generation requirements. This TS change is being proposed in anticipation of future seasonal weather conditions that could cause the UHS temperature to exceed the current TS limit of 89 °F.

The licensee's proposed use of a 24-hour average UHS temperature is based on Technical Specification Task Force (TSTF) Traveler TSTF-330, Revision 3, "Allowed Outage Time - Ultimate Heat Sink," dated October 6, 2000 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML003758809). The Nuclear Regulatory Commission (NRC or Commission) approved TSTF-330, Revision 3, and the associated TS changes are reflected in TS 3.7.2, "Plant Systems," in the current version of the Standard Technical Specifications (STS), NUREG-1433, "Standard Technical Specifications General Electric Plants, BWR [boiling-water reactor]/4," Revision 3, dated June 2004.

The supplements dated February 9, July 18, and August 1, 2006, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the staff's original proposed no significant hazards determination as published in the *Federal Register* on August 30, 2005 (70 FR 51382).

## 2.0 REGULATORY EVALUATION

TSTF-330, Revision 3, allows licensees to adopt an averaging approach for satisfying the UHS temperature limit as long as certain criteria are met. During periods when the temperature of the UHS exceeds the current TS limit, continued operation is allowed provided that: (a) the licensee confirms on an hourly basis that the rolling 24-hour average UHS temperature does not exceed this temperature limit, and (b) the UHS temperature does not exceed a new maximum allowed temperature limit that is established based on equipment limitations. TSTF-330 is not applicable to all situations, and licensees who wish to adopt this change to the STS must either confirm that the following conditions are satisfied, or provide justification for any exceptions that are identified:

- a) The UHS is not relied upon for immediate heat removal (such as to prevent containment overpressurization), but is relied upon for longer-term cooling such that the temperature averaging approach continues to satisfy the accident analysis assumptions for heat removal over time.
- b) When the UHS is at the proposed maximum allowed value, equipment that is relied upon for accident mitigation, anticipated operational occurrences, or for safe shutdown, will not be adversely affected and is not placed in alarm condition or limited in any way at this higher temperature.
- 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 that is proposed.
- 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 water temperature (typical of an infinite heat sink, but the location of the intake and discharge connections, and characteristics of the UHS can have an impact).

The NRC staff's acceptance of the proposed changes to Hope Creek TS 3.7.1.3 is based on whether the proposed changes satisfy the considerations that were specified by TSTF-330 as discussed above.

## 3.0 TECHNICAL EVALUATION

### 3.1 System Description/Affected Equipment

The Station Service Water System (SSWS) is described in Section 9.2.1 of the Hope Creek Updated Final Safety Analysis Report (UFSAR). The SSWS provides water from the Delaware River (which serves as the UHS) to cool the Safety Auxiliary Cooling System (SACS) heat exchangers and the Reactor Auxiliary Cooling System (RACS) heat exchangers during normal operating conditions and loss of offsite power (LOP) conditions. The SACS provides cooling to engineered safety features (ESF) equipment (including the residual heat removal (RHR) system heat exchangers), while the RACS only cools non-safety-related components. During a loss-of-coolant accident (LOCA) and other design-basis accidents, the SSWS provides river water only

to cool the SACS heat exchangers. The RACS heat exchangers are isolated from the SSWS in the event of a LOCA.

Temperature sensors are located at the discharge of each SSWS pump strainer. These sensors provide signals to temperature indicators in the main control room. The average UHS temperature is calculated from these indicators. As discussed in the letter that was submitted on February 9, 2006 (response to Question 3), the licensee indicated that instrument uncertainty, as well as model uncertainty and heat load uncertainty, were accounted for in the analysis.

The licensee's supplement dated July 18, 2006, stated that the proposed maximum allowable UHS temperature of 91.4 °F is based on maintaining the SACS heat exchanger outlet temperature at its current design basis transient/accident limit of 100 °F. This design-basis limit was established in Hope Creek Amendment No. 120 which was issued by the NRC on April 19, 1999 (ADAMS Accession No. ML011770031).

### 3.2 Proposed TS Changes

The licensee's application dated August 4, 2005, proposed that TS 3.7.1.3 be revised to allow a 24-hour average temperature to be used if the UHS temperature exceeds 89.5 °F, provided the UHS temperature or the SACS temperature does not exceed 95 °F. However, in its supplement dated July 18, 2006, the licensee revised the amendment request, proposing more restrictive changes than those requested in the original application (i.e., the supplement reduced the scope of the amendment as originally proposed). Specifically, the proposed UHS temperature limit was reduced from 89.5 °F to 89 °F, unchanged from the current TS 3.7.1.3 limit. The proposed maximum allowable temperature was reduced from 95 °F to 91.4 °F.

The Action Statement in TS 3.7.1.3 currently states:

With the river water temperature in excess of 85.0 EF, continued plant operation is permitted provided that both emergency overboard discharge valves are open and emergency discharge pathways are available. With the river water temperature in excess of 88.0 EF, continued plant operation is permitted provided that all of the following additional conditions are satisfied: ultimate heat sink temperature is at or below 89.0 EF, all SSWS pumps are OPERABLE, all SACS pumps are OPERABLE, all EDGs [emergency diesel generators] are OPERABLE and the SACS loops have no cross-connected loads (unless they are automatically isolated during a LOP and/or LOCA); otherwise, with the requirements of the above specification not satisfied:

As requested in the supplement dated July 18, 2006, the proposed amendment would revise the Action Statement in TS 3.7.1.3 to read:

With the river water temperature in excess of 85.0 EF, continued plant operation is permitted provided that both emergency overboard discharge valves are open and emergency discharge pathways are available. With the river water temperature in excess of 88.0 EF, 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 89.0 EF and less than or equal to 91.4 EF, verify once per hour that water temperature of the ultimate heat sink is less than or equal to 89.0 EF averaged over the previous 24 hour period; otherwise, with the requirements of the above specification not satisfied:

### 3.3 TSTF-330 Conditions

As discussed in Section 2.0 of this evaluation, licensees must confirm that certain conditions are satisfied in order to adopt the provisions of TSTF-330. The licensee's confirmation that these conditions are satisfied provides adequate assurance that accident analysis assumptions will remain valid and structures, systems, and components will not be adversely affected by the proposed changes. Safety Evaluation (SE) Sections 3.3.1 through 3.3.4 provide the NRC staff's assessment of the licensee's response to the conditions specified by TSTF-330.

#### 3.3.1 TSTF-330, Condition (a)

Condition (a) in TSTF-330 states that licensees wishing to adopt the change must either confirm that the following condition is satisfied (or provide justification for any exceptions):

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

The licensee's supplement dated July 18, 2006, stated that the UHS is not immediately relied upon to provide post-accident primary containment heat removal. That function is provided by the suppression pool and its initial temperature is independent of UHS temperature. The NRC staff has confirmed that TS 3.6.2.1 specifies temperature requirements that apply to the suppression pool that are independent of the UHS temperature requirements. No exceptions to this condition were identified. Therefore, the staff considers the licensee's response to TSTF-330, condition (a), to be acceptable.

#### 3.3.2 TSTF-330, Condition (b)

Condition (b) in TSTF-330 states that licensees wishing to adopt the change must either confirm that the following condition is satisfied (or provide justification for any exceptions):

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

The licensee's supplement dated July 18, 2006, stated that equipment that is relied upon for accident mitigation, anticipated operational occurrences, or for safe shutdown, is cooled by the SACS. The licensee's analysis confirms that if the UHS temperature does not exceed the proposed maximum value of 91.4 EF, the SACS heat exchanger outlet cooling water temperature will not exceed the current design-basis value of 100 EF. The licensee also confirmed that the design-basis heat removal capability of the RHR heat exchangers, as

assumed in the Hope Creek accident analyses for long-term cooling considerations, will continue to be maintained for continuous UHS temperatures up to the proposed TS limit of 91.4 °F. No exceptions to TSTF-330, condition (b), were identified. Therefore, the staff considers the licensee's response to TSTF-330, condition (b), to be acceptable.

### 3.3.3 TSTF-330, Condition (c)

Condition (c) in TSTF-330 states that licensees wishing to adopt the change must either confirm that the following condition is satisfied (or provide justification for any exceptions):

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 that is proposed.

The licensee's supplement dated July 18, 2006, stated that the proposed change does not alter any assumptions on which the current plant safety analysis is based. The licensee confirmed that the response to Generic Letter 96-06 is not affected by the proposed changes, and further stated that affected components were originally designed with margin that allows for cooling water temperatures greater than the current UHS temperature limit of 89 °F. The licensee indicated that analyses that have been completed demonstrate that the safety-related equipment that relies on the UHS for cooling will remain capable of performing their design-basis functions at the proposed maximum UHS temperature of 91.4 °F. This is supported by the licensee's response to TSTF-330, condition (b), as discussed above in Section 3.3.2. No exceptions to TSTF-330, condition (c), were identified. Therefore, the staff considers the licensee's response to TSTF-330, condition (c), to be acceptable.

### 3.3.4 TSTF-330, Condition (d)

Condition (d) in TSTF-330 states that licensees wishing to adopt the change must either confirm that the following condition is satisfied (or provide justification for any exceptions):

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

The licensee's supplement dated July 18, 2006, stated that the Hope Creek service water intake structure is about 1500 feet south of the cooling tower discharge. The large tidal influence in the Delaware River dilutes, mixes, and rapidly dissipates the thermal discharges from Hope Creek. In addition, the New Jersey Pollutant Discharge Elimination System permit for Hope Creek limits the temperature rise in the river to 1.5 °F at the end of the "mixing zone" during the months of June, July, and August. The mixing zone is 2500 feet up river, 2500 down river, and 1500 feet offshore. During an accident, the plant would be shut down and the heat input from the circulating water system would be greatly reduced. The descriptive information that was provided provides sufficient confirmation that cooling water that is being discharged from the plant will not affect the UHS intake water temperature. The staff's conclusion is based primarily upon the large volume of water that is available, the location of the intake structure relative to the cooling tower discharge, and the reduced influence of the circulating water system during limiting accident conditions.

### 3.4 Technical Evaluation Conclusion

Based on the considerations discussed in SE Section 3.3, the NRC staff concludes that PSEG has adequately addressed the conditions that were specified by the NRC staff for adopting the provisions of TSTF-330, Revision 3, confirming that the averaging approach for satisfying the UHS temperature requirements can be applied to Hope Creek. Therefore, the proposed changes to Hope Creek TS 3.7.1.3 are acceptable.

### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New Jersey State Official was notified of the proposed issuance of the amendment. In a letter to the NRC dated January 5, 2006, the State of New Jersey provided the following comment:

PSEG did not address the effects, if any, that the proposed Hope Creek extended power uprate might have on its technical analysis of the subject change. PSEG should revise this analysis to include the results of its review of the extended power uprate in relation to the proposed change. The revised analysis should be forwarded to both the NRC and the NJ DEP BNE [New Jersey Department of Environmental Protection, Bureau of Nuclear Engineering].

At the time the State of New Jersey provided its comment, the NRC staff was in the initial stages of reviewing a proposed extended power uprate (EPU) amendment request from PSEG for Hope Creek (PSEG's EPU request dated November 7, 2005, ADAMS Accession No. ML053200202). However, in a letter to the NRC dated February 10, 2006, PSEG withdrew the Hope Creek amendment request. PSEG's letter stated that it intended to resubmit the EPU request at a later date. To date, the EPU request has not been resubmitted. If, and when, the Hope Creek EPU application is resubmitted, and if the EPU analyses affect the UHS analyses, the licensee will be required to address those changes as part of the EPU application.

### 5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (70 FR 51382). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: R. Ennis  
J. Tatum

Date: August 1, 2006