

January 18, 2011

MEMORANDUM TO: Harold K. Chernoff, Chief  
Plant Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

FROM: Richard B. Ennis, Senior Project Manager */ra/*  
Plant Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

SUBJECT: HOPE CREEK GENERATING STATION, DRAFT REQUEST FOR  
ADDITIONAL INFORMATION (TAC NO. ME3597)

The attached draft request for additional information (RAI) was transmitted on January 18, 2011, to Mr. Jeff Keenan of PSEG Nuclear LLC (the licensee). This information was transmitted to facilitate an upcoming conference call in order to clarify the licensee's amendment request for Hope Creek Generating Station dated March 29, 2010, as supplemented by letters dated May 28, 2010, and September 30, 2010. The proposed amendment would revise the Technical Specifications to extend the allowed outage time for the "A" and "B" emergency diesel generators from 72 hours to 14 days.

This memorandum and the attachment do not convey or represent an NRC staff position regarding the licensee's request.

Docket No. 50-354

Attachment: Draft RAI

January 18, 2011

MEMORANDUM TO: Harold K. Chernoff, Chief  
Plant Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

FROM: Richard B. Ennis, Senior Project Manager */ra/*  
Plant Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

SUBJECT: HOPE CREEK GENERATING STATION, DRAFT REQUEST FOR  
ADDITIONAL INFORMATION (TAC NO. ME3597)

The attached draft request for additional information (RAI) was transmitted on January 18, 2011, to Mr. Jeff Keenan of PSEG Nuclear LLC (the licensee). This information was transmitted to facilitate an upcoming conference call in order to clarify the licensee's amendment request for Hope Creek Generating Station dated March 29, 2010, as supplemented by letters dated May 28, 2010, and September 30, 2010. The proposed amendment would revise the Technical Specifications to extend the allowed outage time for the "A" and "B" emergency diesel generators from 72 hours to 14 days.

This memorandum and the attachment do not convey or represent an NRC staff position regarding the licensee's request.

Docket No. 50-354

Attachment: Draft RAI

DISTRIBUTION

PUBLIC  
LPL1-2 R/F  
RidsNrrDorlLpl1-2 Resource  
RidsNrrDorlDpr Resource  
RidsNrrPMREnnis Resource

AHowe, NRR/DRA/APLA  
GWaig, NRR/DIRS/ITSB  
VGoel, NRR/DE/EEEE

ACCESSION NO.: ML110190135

OFFICE	LPL1-2/PM
NAME	REnnis
DATE	1/18/11

OFFICIAL RECORD COPY

DRAFT REQUEST FOR ADDITIONAL INFORMATION

REGARDING PROPOSED LICENSE AMENDMENT

EMERGENCY DIESEL GENERATORS A AND B ALLOWED OUTAGE TIME EXTENSION

HOPE CREEK GENERATING STATION

DOCKET NO. 50-354

By application dated March 29, 2010, as supplemented by letters dated May 28, 2010, and September 30, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML100900458, ML101590514, and ML102870101 respectively), PSEG Nuclear LLC (PSEG or the licensee) submitted a license amendment request for the Hope Creek Generating Station (HCGS). The proposed amendment would revise the Technical Specifications (TSs) to extend the allowed outage time (AOT) for the "A" and "B" emergency diesel generators (EDGs) from 72 hours to 14 days.

The Nuclear Regulatory Commission (NRC) staff has reviewed the information the licensee provided that supports the proposed amendment and would like to discuss the following issues to clarify the submittal.

Background

Page 11 of Attachment 1 of the application dated March 29, 2010, states that the Tier 2 evaluation is provided in Attachment 4. Page 3-1 of Attachment 4 refers to Appendix D for the Tier 2 evaluation. Appendix D to Attachment 4, "Risk Significant Configurations (Tier 2)," identifies six "configuration specific actions to be discussed" on pages D-2 and D-3, but there is no further reference made to these actions, and no commitments made. Table D-1 is a listing of basic event importance measures and includes six footnotes on page D-11 which are essentially identical to the six original compensatory measures committed to in Attachment 5 of the application (commitments 1-6 correspond to compensatory measures 1-6, respectively). Based on the above, the NRC staff infers that the six original commitments, in Attachment 5 of the application dated March 29, 2010, represent the Tier 2 restrictions to avoid risk-significant plant configurations, consistent with the three-tiered approach discussed in Regulatory Guide (RG) 1.177. It is further inferred by the staff that the six "configuration specific actions to be discussed" are not considered to be part of the Tier 2 restrictions supporting this license amendment request. Subsequently, in Attachment 4 to the supplement dated September 30, 2010, the licensee revised and renumbered the original commitments (and associated compensatory measures) that were contained in the application. Based on the response to request for additional information (RAI) question 1.a.3, it appears that the five revised commitments, in Attachment 4 of the supplement dated September 30, 2010, represent the RG 1.77 Tier 2 restrictions supporting this risk-informed licensing action.

Table 3.4-5 in Attachment 4 of the application dated March 29, 2010, provides quantitative results for six cases. The values in the Table 3.4-5 case labeled "Compensatory Measures 3-6" match the values in the table titled "Results of the Risk Evaluation for Hope Creek" in Section 4.5.4 of Attachment 1 of the application (Section 4.5.4 provides the licensee's conclusions regarding the proposed license amendment request). As noted above, in

Attachment 4 to the supplement dated September 30, 2010, the licensee revised and renumbered the original commitments (and associated compensatory measures) that were contained in the application. In addition, Table RAI-5c-1 in Attachment 2 of the supplement dated September 30, 2010, provided a revised version of Table 3.4-5 reflecting the renumbering of the compensatory measures and adding two sensitivity cases. The values in the Table RAI-5c-1 case labeled "Compensatory Measures 1-4 (of Attachment 4)" match the values in the table titled "Results of the Risk Evaluation for Hope Creek" in Section 4.5.4 of Attachment 1 of the application dated March 29, 2010. Based on the above, the NRC staff infers that the compensatory measures shown in commitments 1, 2, 3, and 4 in Attachment 4 of the supplement dated September 30, 2010, are credited in the risk analysis which is the proposed licensing basis for the 14-day EDG AOT.

#### Request for Additional Information

1. Based on the information provided by the licensee, it appears that the five compensatory measures reflected in commitments 1 through 5 in Attachment 4 of the supplement dated September 30, 2010, represent the RG 1.77 Tier 2 restrictions supporting this risk-informed licensing action. In addition, it appears that the compensatory measures shown in commitments 1, 2, 3, and 4 in Attachment 4 of the supplement dated September 30, 2010, are credited in the risk analysis which would become the licensing basis for the 14-day EDG AOT. Please confirm that:
  - a. The five compensatory measures reflected in commitments 1 through 5 in Attachment 4 of the supplement dated September 30, 2010, represent the RG 1.77 Tier 2 restrictions supporting this risk-informed licensing action.
  - b. The compensatory measures shown in commitments 1, 2, 3, and 4 in Attachment 4 of the supplement dated September 30, 2010, are credited in the risk analysis which would become the licensing basis for the 14-day EDG AOT (i.e., values shown in table titled "Results of the Risk Evaluation for Hope Creek" in Section 4.5.4 of Attachment 1 of the application dated March 29, 2010).
  - c. The compensatory measures shown in commitments 1, 2, 3, and 4 in Attachment 4 of the supplement dated September 30, 2010, are being relied on to meet the acceptance guidelines of RG 1.174.
  - d. The compensatory measure shown in commitment 5 in Attachment 4 of the supplement dated September 30, 2010, is not credited in the risk analysis.
2. Consistent with the guidance in SECY-98-224, "Staff and Industry Activities Pertaining to the Management of Commitments Made by Power Reactor Licensees to the NRC," dated September 28, 1998 (ADAMS Accession No. ML992870043), and NRR Office Instruction LIC-100, "Control of Licensing Bases for Operating Reactors" (ADAMS Accession No. ML010660227), escalating a licensee commitment into a legally binding requirement should be reserved for matters that warrant: (1) inclusion in the TSs based on the criteria in 10 CFR 50.36; or (2) inclusion in the license (which includes the TSs) based on determination that the issue is of high safety or regulatory significance. The major

distinction between obligations and other parts of the licensing bases is that changes generally cannot be made without prior NRC approval.

As discussed in RG 1.177, the intent of the Tier 2 evaluations is to identify risk-significant plant configurations, not considered in the Tier 1 analyses, which should be avoided during a proposed extended AOT. Based on the sensitivity studies provided to the NRC staff in the licensee's submittals, it is not clear that any of compensatory measures shown in Attachment 4 of the supplement dated September 30, 2010, individually or as a group, are risk-significant. However, it appears that the licensee has identified these compensatory measures as necessary Tier 2 restrictions and has credited some of them in the risk analysis in order to meet the acceptance guidelines of RG 1.174.

The commitments, shown in Attachment 4 of the supplement dated September 30, 2010, which are Tier 2 restrictions and are credited in the risk analysis are considered by the NRC staff to be of high regulatory significance (i.e., associated compensatory measures are important with respect to NRC's determination on acceptability of proposed amendment). Consistent with the guidance in SECY-98-224 and NRR Office Instruction LIC-100, these types of commitments warrant inclusion in the TSs or the license to ensure NRC prior approval if the commitments are changed in the future. Please propose suitable TS required actions for such commitments/compensatory measures. As noted above, it appears that commitments 1, 2, 3, and 4 in Attachment 4 of the supplement dated September 30, 2010, are Tier 2 restrictions and are credited in the risk analysis. RAI questions 3 through 6 below provide further concerns regarding the specific compensatory measures associated with commitments 1, 2, 3, and 4, respectively.

The NRC staff notes that the licensee may wish to re-evaluate the scope of its Tier 2 restrictions and, if appropriate, provide revised Tier 1 risk analyses which do not credit one or more of these items.

3. A plain language reading of commitment 1 in Attachment 4 of the supplement dated September 30, 2010, implies that simultaneous outages of the A and C EDGs, or of the B and D EDGs, will be prohibited. In response to RAI 1.c.2 (page 6 of Attachment 1 of the supplement dated September 30, 2010), the licensee stated that the commitment only applies to verification of operability prior to removing the EDG from service, and that the existing 2-hour completion time (CT) applicable when two EDGs are inoperable would then apply for any emergent EDG failure. Since the 14-day CT cannot apply to the condition of two EDGs inoperable per the existing TSs, this commitment appears to simply state that the licensee will not deliberately violate the TSs. The licensee needs to clarify how this commitment implements any action more restrictive than the existing TSs, or provide revised risk analyses which do not credit the commitment and delete it from the Tier 2 restrictions.
4. A plain language reading of commitment 2 in Attachment 4 of the supplement dated September 30, 2010, implies that high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) will be operable while the 14-day CT is in effect for any EDG. In response to RAI 1.a.2 (page 2 of Attachment 1 of the supplement dated September 30, 2010), the licensee indicated that this commitment would apply to both planned

inoperability and emergent failure of EDGs. In response to RAI 1.a.5 (page 4 of Attachment 1 of the supplement dated September 30, 2010), the licensee indicated that inoperabilities of HPCI or RCIC occurring during the EDG 14-day CT would be addressed by the TS required actions associated with HPCI or RCIC. Further, the licensee stated that with an EDG also inoperable, an additional assessment must be made on the effect to systems supplied by the out-of-service EDG (cascading effect) and could procedurally require further TS actions, including entry into TS 3.0.3, as applicable.

It is not clear to the staff that an emergent EDG failure occurring while either HPCI or RCIC (or both) are inoperable would be precluded from using the 14-day CT for the EDG. Specifically, the emergent nature of the failure would preclude an a priori restoration of HPCI/RCIC. Cascading of the impact of the EDG inoperability would appear not to impact HPCI and RCIC, since these systems operate independently of AC power. Since the existing CTs for HPCI and RCIC are also 14 days, plant operation with an EDG and one or both HPCI and RCIC inoperable would not be limited by the TSs or by this commitment. This contradicts the risk analysis basis which assumes concurrent unavailability of the EDG with these systems does not occur. The licensee should revise the commitment to more accurately describe what action is required and propose suitable TS required actions for those actions (see RAI 2 above), or provide revised risk analyses which do not credit this commitment and delete it from the Tier 2 restrictions.

5. Commitment 3 in Attachment 4 of the supplement dated September 30, 2010, has been credited in the risk analysis as a 10% reduction in the turbine trip frequency. No quantitative basis for this reduction, implemented by the procedural restrictions on "production risk," has been provided. The licensee should provide the quantitative basis for the 10% reduction in turbine trip frequency and propose suitable TS required actions for the compensatory measures in this commitment (see RAI 2 above), or provide revised risk analyses which do not credit this commitment and delete it from the Tier 2 restrictions.
6. A plain language reading of commitment 4 in Attachment 4 of the supplement dated September 30, 2010, implies that the EDG 14-day CT will not be voluntarily entered if adverse weather conditions are expected. In response to RAI 1.g (page 7 of Attachment 1 of the supplement dated September 30, 2010), the licensee clarified that "adverse weather" only includes hurricanes, tropical storms, and coastal floods, and that the "expectation" of these conditions would be based on a 10-day weather forecast indicating warnings for hurricanes, tropical storms, or coastal floods. The licensee response also stated that "[t]his commitment requires PSEG to return EDGs to an operable status if Hurricane, Tropical Storm or Coastal flood WARNINGS are issued for the area." However, the commitment does not contain this requirement (only discusses voluntary entry into the 14-day CT).

The NRC staff's understanding is that National Weather Service "warnings" are based on the expectation of conditions within a short time period (e.g., 36 hours in advance for hurricane or tropical storm) and would never be in effect 10 days in advance for such events. It is not clear to the staff why this subset of severe weather events is sufficient, given that many loss-of-offsite-power (LOOP) events are caused by lightning during severe storms, tornadoes, high winds not related to tropical storms, icing events, etc.

The staff is also not clear as to the licensee's statement that the commitment "requires PSEG to return EDGs to operable status," when the plain wording of the commitment refers to considerations taken prior to voluntary entry into the 14-day CT. Further, it is not clear to the staff why weather-related LOOP should be reduced by 75% based on a 10-day forecast for this subset of events.

The licensee needs to clarify its basis for selecting these three types of events and neglecting other weather-related causes of LOOP, justify its 75% reduction in weather-related LOOP frequency, confirm that warnings are in fact issued 10 days in advance of these types of events, and propose suitable TS required actions for the compensatory measures in this commitment (see RAI 2 above), or provide revised risk analyses which do not credit this commitment and delete it from the Tier 2 restrictions.

7. As discussed on page 2 of Attachment 1 of the supplement dated May 28, 2010, and on page 29 of Attachment 2 of the supplement dated September 30, 2010, the licensee plans to credit the existing onsite Gas Turbine Generator (GTG) (designated as Salem Unit 3) as an alternate alternating current (AAC) source in the event of a LOOP concurrent with failure of the EDGs (i.e., for station blackout (SBO) conditions). The licensee has indicated that the AAC is not needed to meet the requirements for SBO, however, the AAC is being credited for defense-in-depth.

Commitment 5 in Attachment 4 of the supplement dated September 30, 2010, requires that the availability of the GTG be checked before entering into any "A" or "B" EDG extended 14-day CT. The licensee has proposed to incorporate this commitment into the TS Bases.

- a. The licensee should clarify the actions that will be taken if the GTG becomes unavailable during the extended EDG outage and revise commitment 5 accordingly. In addition, the commitment should be revised to require that the availability of the GTG be verified at least once every 12 hours.
- b. Several studies have been performed (e.g., NUREG-1784 and NUREG/CR-6890) which concluded that the average duration of LOOP events has increased from the durations assumed at the time of issuance of the SBO rule. As such, from a deterministic perspective, the NRC staff considers that the compensatory measures associated with ensuring that the GTG is available before entering and during the extended 14-day CT is of high regulatory significance (i.e., associated compensatory measures are important with respect to NRC's determination on acceptability of proposed amendment). Consistent with the guidance in SECY-98-224 and NRR Office Instruction LIC-100, this type of commitment warrants inclusion in the TSs or the license to ensure NRC prior approval if the commitment is changed in the future. Please propose suitable TS required actions for the compensatory measures in commitment 5 (as revised based on RAI 7.a).

8. The NRC staff requests that the licensee revise the list of commitments to add the following compensatory measures:
  - a. The system dispatcher will be contacted once per day and informed of the EDG outage status during the 14-day EDG CT.
  - b. Operating crews will be briefed on the EDG work plan and procedural actions regarding LOOP and SBO, prior to entering the 14-day EDG CT.

The above compensatory measures should be incorporated into the appropriate plant procedures and the procedure number(s) should be listed in the respective commitment.