February 23, 2007

Mr. William Levis
Senior Vice President & Chief Nuclear Officer
PSEG Nuclear LLC-X04
Post Office Box 236
Hancocks Bridge, NJ 08038

SUBJECT: HOPE CREEK GENERATING STATION - REQUEST FOR ADDITIONAL INFORMATION REGARDING REQUEST FOR EXTENDED POWER UPRATE (TAC NO. MD3002)

Dear Mr. Levis:

By letter dated September 18, 2006 (Agencywide Documents and Management System (ADAMS) Accession No. ML062680451), as supplemented on October 10, 2006 (Accession No. ML062920092), and October 20, 2006 (Accession No. ML063110164) PSEG Nuclear, LLC submitted an amendment request for an extended power uprate at the Hope Creek Nuclear Generating Station. The proposed amendment would increase the authorized maximum power level by approximately 15 percent, from 3339 megawatts thermal (MWt) to 3840 MWt.

The Nuclear Regulatory Commission (NRC) staff has been reviewing the submittal and has determined that additional information is needed to complete its review. The specific questions are found in the enclosed request for additional information (RAI). The questions were sent by e-mail to you on February 6, 2007 (Accession No. ML070530679), to ensure that the questions were understandable, the regulatory basis was clear and to determine if the information was previously docketed. In subsequent discussions with your staff some questions were deleted or revised for further clarification. Paul Duke of your staff agreed to respond within 30 days from the date of this letter for all the enclosed questions.

Please note that if you do not respond to this letter within the prescribed response times or provide an acceptable alternate date in writing, we may reject your application for amendment under the provisions of Title 10 of the *Code of Federal Regulations*, Section 2.108. If you have any questions, I can be reached at (301) 415-1388.

Sincerely,

/ra/

James J. Shea, Project Manager, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-354

cc w/encl: See next page

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Hope Creek Generating Station

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REQUEST FOR ADDITIONAL INFORMATION

REGARDING TECHNICAL SPECIFICATION CHANGES FOR

EXTENDED POWER UPRATE

HOPE CREEK GENERATING STATION

DOCKET NO. 50-354

By letter dated September 18, 2006 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML062680451), as supplemented on October 10, 2006 (Accession No. ML062920092), and October 20, 2006 (Accession No. ML063110164), PSEG Nuclear, LLC (PSEG or the licensee) submitted an amendment request for an extended power uprate (EPU) at the Hope Creek Nuclear Generating Station (Hope Creek). The proposed amendment would increase the authorized maximum power level by approximately 15 percent, from 3339 megawatts thermal (MWt) to 3840 MWt.

The Nuclear Regulatory Commission (NRC) staff has been reviewing the submittal and has determined that additional information is needed to complete its review.

5) Piping & NDE Branch (CPNB)

5.1 Identify the materials of construction for the reactor coolant pressure boundary (RCPB) piping/safe-ends. Discuss and explain the effect of the requested power uprate on the RCPB piping/safe-end materials.

5.2 Identify the RCPB piping/safe-end components that are susceptible to intergranular stress corrosion cracking (IGSCC). Discuss any augmented inspection programs that have been implemented and the adequacy of the augmented inspection programs in light of the EPU.

5.3 Identify all flawed components including overlay repaired welds that have been accepted for continued service by analytical evaluation based on American Society of Mechanical Engineers (ASME), Section XI rules. Discuss the adequacy of such analysis considering the effect of the EPU on the flaws.

5.4 Identify the mitigation processes being applied at Hope Creek to reduce the RCPB component's susceptibility to IGSCC, and discuss the effect of the requested EPU on the effectiveness of these mitigation processes. For example, if hydrogen water chemistry (HWC) was applied at the plant, it would be necessary to perform the electrochemical potential measurements at the most limiting locations to ensure that the applied hydrogen injection rate is adequate to maintain the effectiveness of HWC since oxygen content in the coolant is expected to increase due to increased radiolysis of water resulting from extended power uprate.

ENCLOSURE

6) Accident Dose Branch (AADB)

6.1 "Calculation No. H-1-AB-MDC-1854, Revision 1IR0, Main Steam Line Break (MSLB) Accident," sheet 11, section 4.13 states that credit is not taken for the engineered safety features of the control room emergency filtration (CREF) system that mitigate airborne activity within the control room. Is the CREF designed to initiate for MSLB? If so, how are the assumptions bounding?

6.2 Question Deleted.

7) Balance-of-Plant Branch (SBPB)

7.1 The Hope Creek Updated Final Safety Analysis Report (UFSAR) Section 9.1.3.1 states:

"The Spent Fuel Pool Closed Cooling (FPCC) system is designed to handle the decay heat released by all anticipated combinations of spent fuel that could be stored in the fuel pool. The pool water temperature is maintained at a maximum of 135 °F under the design load of 16.1 x 10^6 Btu/h. This heat load is the discharge of a reload quantity of spent fuel (approximately one third of the core) at the end of a fuel cycle, plus the decay heat of the reload spent fuel from all previous refuelings."

a) Please explain how the plant licensing basis will continue to be satisfied in this regard following the Constant Pressure Power Uprate (CPPU).

b) Table 9.1-1 of the Hope Creek original Final Safety Analysis Report (FSAR) listed the heat transfer capability of the fuel pool heat exchangers as 6.0 x 10^6 Btu/h, and the current revision of Table 9.1-1 lists the heat transfer capability as 9.515 x 10^6 Btu/h. There is an apparent discrepancy in that the heat transfer capability that is listed for the fuel pool heat exchangers compared to the licensing basis fuel pool heat load of 16.1 x 10^6 Btu/h. Please explain.

7.2 The Hope Creek UFSAR Section 9.1.3.1 states:

"The Fuel Pool Cooling and Cleanup (FPCC) System is designed to permit the Residual Heat Removal (RHR) System to be operated in parallel with the FPCC system through a crosstie, to remove the maximum heat load and to maintain the bulk water temperature in the spent fuel pool [SFP] at or below 150 °F, with a maximum anticipated heat load of 34.2 x 10^6 Btu/h. This heat load is the discharge of one full core of fuel at the end of a fuel cycle, plus the decay heat of the reload spent fuel from all previous refuelings. If required, one RHR pump and one RHR heat exchanger can be aligned to augment the FPCC system through the system crosstie. For this system configuration, a heat load greater than 45 million Btu/hr can be removed from the spent fuel pool with a maximum SACS [Safety Auxiliaries Cooling System] inlet temperature to the RHR heat exchanger of 95 °F and a spent fuel pool temperature of 152 °F."

a) Please explain the differences in RHR system function and alignment and other design parameters (if applicable) in the above paragraph where one alignment can remove 34.2 x 10^6 Btu/h and the other alignment can remove 45 x 10^6 Btu/h.

b) Please explain how the plant licensing basis will continue to be satisfied in this regard following the CPPU.

7.3 The Hope Creek UFSAR Section 9.1.3.6 states:

"Acceptance Criterion II.l.d.(4) of Standard Review Plan (SRP) 9.1.3 limits the water temperature in the fuel pool to 140 °F at the maximum heat load with the normal cooling system operating in a single active failure condition.

The bulk water temperature in the fuel pool could reach 152 °F if one FPCC pump was not available, or 174 °F if one FPCC pump and one FPCC heat exchanger were not available with a maximum normal heat load of 16.1 x 10^6 BTU/hr. The radiological consequences of the fuel pool temperature reaching 152 °F and 174 °F have been evaluated. The resultant doses will not exceed 10 CFR 20 limits at the site boundary. However, the RHR System can be manually aligned to provide supplemental cooling."

a) Apparently none of the calculations for CPPU fuel pool cooling as summarized in Table 6-3 of the Power Uprate Safety Analysis Report (PUSAR) considered a single failure in the FPCC system. Please explain how the plant licensing basis will continue to be satisfied as described above including meeting the specified maximum temperatures with a single failure in FPCC without crediting RHR.

b) The above UFSAR section indicates that the maximum normal fuel pool heat load with postulated single failures is 16.1 x 10^6 BTU/hr. The normal fuel pool heat load corresponds to the batch core offload (approximately one third of the core).

b.1) Confirm that the Hope Creek normal fuel pool heat load is still valid and that the full core offload continues to be an unusual situation such that a single failure for the full core offload does not have to be assumed. Provide the frequency of performing full core offloads and explain to what extent this is limited by plant procedures.

b.2) Provide the frequency of performing full core offloads and explain to what extent this is limited to assure compliance with the plant licensing basis in this regard.

7.4 The Hope Creek UFSAR Section 9.1.3.6 states that the fuel pool loads are calculated based on SRP Section 9.1.3 and Branch Technical Position ASB 9-2 except, a) for Hope Creek "annual refueling" means 18 month refueling, and b) the decay time is assumed to be 8 days for calculating the normal heat load, and 10 days for calculating the maximum heat load.

Configurations 1, 2, and 3 of Table 6-3 of the PUSAR show the time to initiate fuel transfer to SFP as 59 hours, 24 hours, and 74 hours, respectively.

a) Please explain the large difference between the decay times described in UFSAR section 9.1.3.6 and the fuel transfer times listed in Configurations 1, 2, and 3 of Table 6-3 of the PUSAR.

b) Explain how the plant will continue to meet the plant licensing basis as reflected in UFSAR Section 9.1.3.6 above for CPPU.

7.5 The Hope Creek UFSAR Section Section 6.4.1.1.2 of the PUSAR states:

"The SACS LOCA [loss of coolant accident] heat load calculation conservatively assumes that Spent Fuel Pool (SFP) cooling is not shed; however, an over conservatism was removed from this assumption. The CLTP [Current Licensed Thermal Power] LOCA calculation assumed the maximum SFP heat load immediately following a full fuel offload. The CPPU calculation credits the delay between offload and returning to power operation. This change results in a lower CPPU SFP heat load as well as no net increase in the total SACS LOCA heat load assumed between CLTP and CPPU."

a) What amount of delay time is credited between offload and returning to power operation?

b) What controls have been established to assure that the plant is not returned to service following a refueling outage until after the assumed delay time has passed?

c) Confirm that the assumed delay time will be reflected in the UFSAR for CPPU operation.

7.6 Question Deleted.

7.7 Hope Creek EPU License Amendment Request, Attachment 10, Matrix 5, under flood protection states that the Hope Creek flooding analysis determined that CPPU may result in flood level increases of up to 36 percent in certain areas but that the equipment in the affected areas has been previously analyzed for wetting and submergence.

Section 8.1 of the PUSAR states "Hope Creek has sufficient capacity to handle added liquid increases required, i.e., it can collect and process the drain fluids. The drainage systems backflow at maximum flood levels and infiltration of radioactive water into non-radioactive water drains do not change as a result of CPPU

a) Provide a listing of the areas that have changes in the flood level, what equipment is affected in those areas, and why the effect does not impact plant safety.

b) Do the maximum flood levels and the infiltration of radioactive water into non-radioactive water drains considered in section 8.1 of the PUSAR consider the flood level increases of up to 36% described in Attachment 10, Matrix 5? If not, what are the effects of the increase in flood level?

7.8 PUSAR Section 6.4.1.1.2 states that diesel generator loads remain unchanged for a LOCA, and Section 6.1.1 states that the existing emergency power system is adequate.

UFSAR Section 9.5.4 states "The standby diesel generator (SDG) fuel oil storage and transfer system provides onsite storage for at least 7 days of operation to all SDGs as they operate at their full operating loads as described in SDG loading calculation E-9(Q)."

Explain how the proposed power uprate will affect the SDG loading sequence and the duration of the SDG loads for postulated accident conditions, and describe the impact that this will have on the SDG fuel oil inventory that is required to support seven days of SDG operation. Explain how the required inventory is assured by the existing Technical Specification requirements, including consideration of usable fuel oil storage tank volume and measurement uncertainties.

8) <u>SG Tube Integrity & Chem. Eng Br (CSGB)</u>

8.1 Section 3.11 of the PUSAR states that there are slight changes in Reactor Water Cleanup (RWCU) system operating conditions due to a decrease in inlet temperature and increase in operating pressure. Please provide the magnitude of these changes.

8.2 Section 3.11 of the PUSAR concludes that at power uprate conditions the RWCU system will perform adequately at the present flow rate. Please discuss the aspects of the system that were evaluated and the parameters evaluated to reach this conclusion (for example, the effects of changes in temperature, pressure, chemistry, and flow rate on heat exchanger heat transfer and materials).

8.3 According to PUSAR Section 3.11, the concentration of iron in the reactor water is expected to increase from 16 ppb to 19 ppb, but that this is within the design chemistry limits and does not affect performance of the RWCU system. Please discuss the remaining margin between the expected iron level and the design limit.

8.4 PUSAR Sections 3.11 and 4.1.3 state that some containment isolation valves have reduced operating margins but remain capable of performing their isolation function. Please discuss how the operating margin is reduced by the proposed power uprate and by how much.

8.5 According to Section 3.11 of the PUSAR, the proposed power uprate would cause an increase in the filter/demineralizer backwash frequency. Please discuss the amount of the increase relative to the capacity for processing liquid and solid radwaste.

8.6 According to NRC Regulatory Guide 1.183, the analysis release duration for a LOCA is 30 days, and a pH greater than 7 will prevent iodine re-evolution. The suppression pool pH analysis provided to the staff in 2001, which was part of a request to use an alternate source term, was performed for a power level of 3458 MWth. Please discuss whether the pH analysis bounds conditions at the proposed EPU power level of 3840 MWth. If the previously analysis does not bound the proposed EPU conditions, please provide an updated evaluation showing the suppression pool pH will be greater than 7 for the 30-day LOCA period.