May 14, 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, as supplemented by letters dated October 10, 2006, October 20, 2006, February 14, February 16, February 28, March 13, and April 18, 2007, PSEG Nuclear, LLC (PSEG or licensee) submitted an amendment request for an extended power uprate (EPU) for Hope Creek Nuclear Generating Station (Hope Creek). The proposed amendment would increase the authorized maximum power level by approximately 15%, 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. The questions were sent by e-mail to you 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, questions were revised for further clarification. In order to maintain the current review schedule the NRC staff requested a response to all questions by May 18, 2007. Your staff stated that they could respond to the enclosed questions by May 22, 2007, except for questions 3.67 and 8.21, for which responses would be provided by May 25, 2007.

Please note that if you cannot respond to all questions by May 18, 2007, as NRC staff requested, then the schedule may be adversely impacted. If you have any questions, I can be reached at (301) 415-1388.

Sincerely,

/ra/ (R.B. Ennis for)

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

Docket No. 50-354

Enclosure: As Stated

cc w/encl: See next page

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REQUEST FOR ADDITIONAL INFORMATION

REGARDING TECHNICAL SPECIFICATION CHANGES FOR

ENCLOSUREEXTENDED POWER UPRATE

HOPE CREEK GENERATING STATION

DOCKET NO. 50-354

By letter dated September 18, 2006 (Agencywide Documents and Management System (ADAMS) Accession No. ML062680451), as supplemented on October 10, 2006 (Accession No. ML062920092), October 20, 2006 (Accession No. ML063110163), February 14, (Accession No. ML070530099), February 16, (Accession No. ML070590178), February 28, (Accession No. ML070680314), March 13 (Accession No. ML071140157), and April 18, 2007 (Accession No. ML071160121), PSEG Nuclear, LLC (PSEG or licensee) submitted an amendment request for an extended power uprate (EPU) for Hope Creek Nuclear Generating Station (Hope Creek). The proposed amendment would increase the authorized maximum power level by approximately 15%, 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.

1) Vessels & Internals Integrity Branch (CVIB) (additional question)

1.6 In response to the request for additional information (RAI) 1.4(b), you stated that for the top guide whose fluence exceeds the irradiated assisted stress corrosion cracking (IASCC) threshold (5×10^{20} n/cm^2) (E > 1 MeV), the grid beams are not required to be inspected. The licensee further states that this is based on the Boiling Water Reactor Vessel and Internals Project (BWRVIP)-26-A, which states that there is no safety consequences resulting from a failure at a single beam intersection, and that a large number of complete separations would need to occur before control rod insertion would be affected.

In order to exclude the top guide grid beams from inspection when their fluence exceeds the IASCC threshold value, it must be demonstrated that failure of multiple beams that exceed the IASCC threshold fluence will not impact the safe shutdown of the reactor during normal, upset, emergency, and faulted conditions. If this cannot be demonstrated, then an inspection program to manage this aging effect to preclude loss of component intended function is required. Previous inspection programs found acceptable by the NRC include those documented in Vermont Yankee's EPU Safety Evaluation (ADAMS Accession Number ML060050028), Section 2.1.3.

2) **Electrical Engineering Branch (EEEB) (additional questions)**

2.6 Please provide the existing and the proposed Hope Creek EPU, expected uprated power level in MWe.

2.7 Please provide the existing and uprated ratings for the main generator (MVA and power factor and include any effect of the power uprate).

2.8 Was the delta portion of the iso-phase bus duct modified for the EPU? Povide the existing and, if necessary, uprated rating (in Amperes).

2.9 Were any modifications made to the unit auxiliary (UAT)/start-up transformers (SAT)? Provide the existing MVA ratings for the UAT/SAT. Is the total calculated loading on the UAT/SAT within the design ratings?

3) Reactor Systems Branch (SRXB) (additional question)

3.66 Please provide the evaluation models (computer codes and version) used for each transient and accident analyzed in the Hope Creek EPU application according to the order of Review Standard for EPU (RS001) Section 2.8.5. If multiple codes were used, please specify all the codes and version used for each event.

3.67 Provide a demonstration analysis using the Statistical Method for Analysis of Anticipated Operational Occurrences (TRACG) to determine the Delta CPR/Initial CPR Vs. Oscillation Magnitude (DIVOM) slope based on a limiting SVEA 96+ legacy fuel bundle in order to demonstrate that any uncertainties in the void reactivity feedback for these legacy bundles would not impact the DIVOM curve determination for fuel Cycle 15.

4) Operator Lic & Human Perf. Br (IOLB) (additional questions)

4.6 Please Clarify that the available times credited in the Hope Creek Updated Final Safety Analysis Report (UFSAR) for manual actions remains the same. In your response to RAI 4.1.C, you stated that the times remain the same for manual actions but did not explicitly state that the available times remain unchanged as well.

4.7 In the response to RAI 4.2.c, you stated that "The greater amount of decay heat due to EPU will affect the operator time associated with decay heat removal results only." Please provide further clarification on how the operator times will be affected.

4.8 PSEG has committed to training licensed operators prior to the EPU implementation, however there were no statements concerning the training of non-licensed personnel. Pleas describe your training plans and commitments for the Hope Creek non-licensed personnel.

4.9 Is the verification of successful completion of operator training required as a part of the Hope Creek Design Change Process?

7) Balance-of-Plant Branch (SBPB) (additional questions)

7.11 Section 10.3.2 of the Hope Creek UFSAR states that the main steam insolation valves (MSIV) and main turbine stop valves (MSVs) can close against maximum steam flow. This licensing basis is partially addressed in of the Hope Creek Power Uprate Safety analysis Report (PUSAR), Attachment 4 of the Hope Creek EPU submittal, Section 3.8 which states that an increase in flow rate assists MSIV closure. However, the PUSAR

does not address the capability of the MSVs to close against the new maximum steam flow of CPPU.

Evaluate the effect of the increased steam flow conditions of the proposed Constant Pressure Power Uprate (CPPU) upon the MSVs to close against maximum steam flow.

7.12 Section 7.4.2 of the PUSAR states that two independent hydraulic analyses were performed to account for feedwater demand transients in a 3 primary condensate pump (PCP), 3 secondary condensate pump (SCP), 3 reactor feedwater pump (RFP) lineup. The purpose of the analyses is to ensure that adequate margin above the CPPU FW flow is available. The PUSAR stated that the predicted operating parameters from the two hydraulic analyses were acceptable.

a) For the two independent analyses, please state in more specific terms what transients were analyzed, what were the results, and what are the conclusions.

b) Describe the impact of the loss of a PCP and/or SCP upon the RFPs at CPPU. How are the margins to RFP trips affected? Are any changes required to achieve acceptable performance?

c) Describe the impact of the loss of a RFP upon the remaining RFPs at CPPU. How are the margins to RFP trips affected? Are any changes required to achieve acceptable performance?

7.13 Section 10.4.7.2 of the Hope Creek UFSAR for the Condensate and Feedwater Systems describes each primary condensate pump (PCP), secondary condensate pump (SCP), and reactor feedwater pump (RFP) as one-third capacity pumps for operation at the current licensed power level.

Section 10.4.7.1 of the UFSAR states that:

“The condensate and feedwater systems are designed to permit continued operation of the plant at reduced power without reactor trip on loss of one of the three primary condensate pumps, one of the three secondary condensate pumps, one of the three reactor feed pumps, or one of the three strings of feedwater heaters.”

Section 7.4 of the PUSAR does not describe any modifications to these pumps for CPPU that would suggest a decrease in the marginal performance for EPU operation.

a) For EPU operating conditions, describe how the PCP, SCP, and RFP normal operating parameters will change as compared to plant operation at the current licensed power level, including a comparison of pump suction pressures, discharge pressures, and margin to pump run out. Also, identify what the minimum allowable pump suction pressures are, what the pump suction pressure trip set points are, and how these trip set points will change for EPU operation.

b) Describe in detail the modeling that was used, analytical methods, assumptions, and analyses that have been completed (including results) that conclusively demonstrate that the plant design basis as described in Section 10.4.7.1 of the

UFSAR will continue to be satisfied for the transient plant response that will occur following EPU implementation, including a bounding estimate of the total amount of uncertainty that exists and specifically what the uncertainties are and how they were determined. Also, describe how the accuracy of this analytical approach was validated for use at the uprated power level, along with the results of an analysis that examines the sensitivity of parameters to scaling effects when extrapolating the analytical methods for use at the uprated power level.

c) For a postulated trip of a PCP, SCP, and RFP (each taken individually), provide the following information for each of the pump trip scenarios:

1. a description of the most limiting case scenario that will result in the lowest RFP suction pressure, either as a direct consequence of the postulated pump trip or as a consequence of other PCP or SCP trips that occur as a result of the transient, and identify what minimum RCP suction pressure will be reached (corrected to account for the total amount of uncertainty that exists);

2. compare the minimum transient RFP suction pressure to the RFP suction pressure trip set point (corrected to compensate for allowable tolerances) and determine the minimum margin that will exist to RFP trip for the transient, and compare this margin to the minimum margin that exists for the current licensed power level.

d) Describe any transient testing that will be completed to confirm that the analytical results are sufficiently conservative and representative of transient EPU operation.

Note that as an alternative to the information referred to above, transient testing that adequately demonstrates that the plant design basis as described in UFSAR Section 10.4.7.1 will be maintained for EPU operation, similar to the pump trip testing that was specified for the Browns Ferry EPU (Accession No: ML062360160) and for the Vermont Yankee EPU (Accession No: ML060050028), is considered to be acceptable.

7.14 UFSAR Section 10.2.6.6., "Overspeed Protection," states that the turbine has two electrical trips, specifically : 1) A primary electrical overspeed trip that is initiated if the turbine speed reaches approximately 8 percent above rated speed, and 2) An emergency electrical overspeed trip that serves as a backup to the primary trip that is initiated at approximately 10 percent above rated speed.

UFSAR Table 10.2-1 states that the overspeed trip is 110% and the backup is 112% of rated speed. The table refers to the overspeed trip as a mechanical trip. The description of the overspeed trip devices in Table 10.2-1 does not appear to be consistent with the description of the overspeed devices in UFSAR Section 10.2.6.6.

Additionally, Attachment 10 of the CPPU submittal, in the notes of Matrix 5, refers only to a mechanical trip that is set at 109.9% - 110.4% with a "normal overspeed" of 109.2% and an "emergency overspeed" value of 119.35%.

Please explain these apparent inconsistencies, and describe how the main turbines will be protected from overspeed conditions following CPPU implementation such that design limitations will not be exceeded. Also, please describe testing that will be completed to assure acceptable performance of the main turbine overspeed protective features.

7.15 Please clarify your RAI response to RAI 7.5 regarding Post EPU spent fuel pool (SFP) Heat Load. The values in the table of your respose specify a normal fuel off load. Whereas, the PUSAR on page 6-7, bottom paragragh, says the Safety Auxiliaries Cooling System Loss of Coolant Accident heat load calculation used a full fuel offload. Should you be considering the full off load condition?

13) Containment and Ventilation Branch (SCVB) (additional question)

13.17 Pleased provide a reference to NRC staff approval of hydrodynamic loads issues for Hope Creek.

13.18 Explain why the drywell head region have to be reanalyzed for subcompartment analyses?

13.19 Explain why the MELLA 66% power/40% flow is the most limiting point on the power flow map for subcompartment analysis.

13.20 The Hope Creek response to GL 97-04 shows that although adequate available net positive suction head (NPSH) existed, the NPSH margin was less than 1 foot for both the core spray and the residual heat removal (RHR) pumps (December 30, 1997 letter to NRC Page 4/5). Was there any change to the NPSH methods described in the Hope Creek response to GL 97-04 for the EPU? If not, how was the increase in suppression pool temperature accommodated?

13.21 Please confirm: The peak bulk pool temperature in Table 4-1 of the PUSAR of 201 F is calculated at 2% above 3339 MWt. The peak bulk pool temperature of 212.3 F is calculated at 2% above 3840 MWt. The peak wetwell air space pressure of 27.6 psig is calculated at 2% above 3339 MWt and the peak wetwell airspace pressure of 27.7 psig is calculated at 2% above 3840 psig.

13.22 The response to RAI 13.9 listed the maximum temperatures for various systems attached to the torus. It is not clear from the response what the temperature limit is for the attached piping to demonstrate that the calculated temperatures at EPU conditions are acceptable, please clarify this temperature limit.