



10 CFR 50.90

**DEC 14 2017**

LR-N17-0176  
LAR H17-03

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

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

Subject: **RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING  
LICENSE AMENDMENT REQUEST FOR MEASUREMENT UNCERTAINTY  
RECAPTURE POWER UPRATE (CAC NO. MF9930)**

- References
1. PSEG letter to NRC, "License Amendment Request for Measurement Uncertainty Recapture (MUR) Power Uprate," dated July 7, 2017 (ADAMS Accession No. ML17188A260)
  2. NRC e-mail to PSEG, "HCGS MUR - Final Request for Additional Information - Electrical Engineering (EEOB)," dated November 16, 2017 (ADAMS Accession No. ML17320A215)

In the Reference 1 letter, PSEG Nuclear LLC (PSEG) submitted a license amendment request for Hope Creek Generating Station (HCGS). The proposed amendment will increase the rated thermal power (RTP) level from 3840 megawatts thermal (MWt) to 3902 MWt, and make Technical Specification (TS) changes as necessary to support operation at the uprated power level.

In Reference 2, the U.S. Nuclear Regulatory Commission staff provided PSEG a Request for Additional Information (RAI) to support the NRC staff's detailed technical review of Reference 1.

PSEG has determined that the information provided in this submittal does not alter the conclusions reached in the 10 CFR 50.92 no significant hazards determination previously submitted. In addition, the information provided in this submittal does not affect the bases for


concluding that neither an environmental impact statement nor an environmental assessment needs to be prepared in connection with the proposed amendment.

No new regulatory commitments are established by this submittal. If you have any questions or require additional information, please do not hesitate to contact Mr. Brian Thomas at (856) 339-2022.

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

Executed on 12/14/17  
(Date)

Respectfully,



Eric Carr  
Site Vice President  
Hope Creek Generating Station

Attachment

1. Response to Request for Additional Information Regarding MUR Power Uprate

cc: Mr. D. Dorman, Administrator, Region I, NRC  
Ms. L. Regner, Project Manager, NRC  
NRC Senior Resident Inspector, Hope Creek  
Mr. P. Mulligan, Chief, NJBNE  
Mr. L. Marabella, Corporate Commitment Tracking Coordinator  
Mr. T. MacEwen, Hope Creek Commitment Tracking Coordinator

**Response to Request for Additional Information Regarding MUR Power Uprate**

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION  
REGARDING LICENSE AMENDMENT REQUEST FOR  
MEASUREMENT UNCERTAINTY RECAPTURE POWER UPRATE

Hope Creek Generating Station  
Docket No. 50-354  
CAC No. MF9930

By application dated July 7, 2017, Public Service Enterprise Group (PSEG), submitted a license amendment request (LAR) for Hope Creek Generating Station (HCGS). The proposed amendment would revise the Operating Licenses and Technical Specifications (TS) to implement a measurement uncertainty recapture (MUR) power uprate or thermal power optimization (TPO). Specifically, the proposed changes would increase the maximum licensed thermal power level from 3,840 megawatts thermal (MWt) to 3,902 MWt, which is an increase of approximately 1.6 percent.

The Electrical Engineering Operating Branch staff has reviewed the information provided by the licensee in the LAR. The following additional information is needed to complete our review of the LAR.

Regulatory Requirements: 10 CFR, Appendix A of Part 50, General Design Criterion (GDC) 17, "Electric Power Systems," requires, in part, that an onsite electric power system and an offsite electric power system be provided to permit functioning of structures, systems, and components important to safety. The safety function for each system (assuming the other system is not functioning) shall be to provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents. The onsite electric power supplies shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure.

**EEOB-1**

Section 6.1.2, "On-Site Power," of Enclosure 8 of the LAR states:

The only identifiable change in electrical load demand is associated with the condensate pumps. These pumps experience increased flow and a small change in horsepower duty due to the TPO uprate conditions. Accordingly, there are negligible changes in the on-site distribution system design basis loads or voltages due to the TPO conditions.

Section 6.2, "DC Power," of Enclosure 8 of the LAR states:

The changes to the auxiliary power system as a result of the TPO uprate are small increases in the horsepower of the condensate pump and the reactor recirculation (RRC) pump motors.

The NRC staff notes that the TPO-related change in electrical load demand is identified as the increase in horsepower of the condensate pumps in Section 6.1.2. However, the change in electrical load demand is identified as the increase in horsepower of both the condensate pumps and the RRC pumps in Section 6.2. The NRC staff also noted that the licensee did not

discuss the change in horsepower for these pumps due to the TPO uprate and the resulting change in the on-site distribution system design basis loads or voltages.

Provide a reason for this discrepancy and clarify which pumps that are impacted by the TPO uprate. Also provide the value or percentage increase in horsepower for the pumps impacted by the TPO uprate and discuss the effects of the increased horsepower on the associated safety-related and/or non-safety-related buses as a result of the TPO uprate.

**Response:**

Both the condensate and reactor recirculation pump power is affected by TPO. The power increase in these pumps was evaluated as part of Hope Creek’s previous Extended Power Uprate (EPU), submittal dated September 16, 2006 (ADAMS Accession No. ML062680447), at a bounding power level of 3952 MWt. For the EPU submittal, it was determined that the pump power at rated conditions was bounded by the load credited in design calculations. A summary of these values is included below:

<b>Pump Motor</b>	<b>Load @ 3952 MWt</b>	<b>Design Calculation Load</b>
Reactor Recirc System M-G Drive Motor 1AG120	7,313 BHP at 100% Core Flow 8,094 BHP at 105% Core Flow	8,550 BHP
Reactor Recirc System M-G Drive Motor 1BG120	7,313 BHP at 100% Core Flow 8,094 BHP at 105% Core Flow	8,550 BHP
Primary Condensate Pump 1A-P-102	1,120 BHP	1,423 BHP
Primary Condensate Pump 1B-P-102	1,120 BHP	1,423 BHP
Primary Condensate Pump 1C-P-102	1,120 BHP	1,500 BHP
Secondary Condensate Pump 1A-P-137	3,240 BHP	3,462 BHP
Secondary Condensate Pump 1B-P-137	3,240 BHP	3,462 BHP
Secondary Condensate Pump 1C-P-137	3,240 BHP	3,650 BHP

Therefore the existing analyses bound operation at TPO conditions of 3902 MWt and there is no effect on the analyzed loads for any electrical buses as a result of the TPO uprate.

**EEOB-2**

Section 10.3.1.1, “Inside Containment,” of Enclosure 8 of the LAR states:

EQ [environmental qualification] for safety-related electrical equipment located inside the containment is based on DBA-LOCA conditions and their resultant temperature, pressure, humidity and radiation consequences, and includes the environments expected to exist during normal plant operation. The current accident conditions for temperature and pressure are based on analyses initiated from at least 102% of CLTP. Normal temperatures may increase slightly near the FW and RRC lines and will be

evaluated through Section A.3.1.2 of UFSAR Appendix A, which addresses the existing program that manages the aging (EQ) of electrical equipment. The current radiation levels under normal plant conditions also increase slightly. The current plant environmental envelope for radiation is not exceeded by the changes resulting from the TPO uprate.

The licensee does not appear to have discussed the impact of the TPO uprate on all the environmental parameters for the safety-related equipment, and has not clearly stated whether the EQ electrical equipment remains qualified for the TPO uprate conditions.

Confirm that all existing environmentally qualified electrical equipment located inside and outside containment remain qualified for TPO uprate conditions during normal and accidents conditions. Include a basis for this response.

**Response:**

The TPO uprate to 3902 MWt does not affect any environmental parameters for EQ equipment.

Section 6.6 of Enclosure 8 of the Hope Creek TPO LAR identifies that the increased heat loads in the drywell are within the capacity of the drywell cooling system. Normal area temperatures are based on the design specification of the drywell cooling system and any actual increases in local temperatures are bounded by the analyzed area temperature.

The design basis accident containment temperature and pressure conditions were determined for EPU using a core thermal power of 4031 MWt (1.02 x 3952 MWt), with the exception of peak bulk suppression pool temperature, which was determined at 3917 MWt (1.02 x 3840 MWt). The results are documented in Table 4-1 of NEDC-33076P, "Safety Analysis Report for Hope Creek Constant Pressure Power Uprate," submitted as Attachment 4 to the Hope Creek EPU license amendment request (ADAMS Accession No. ML062680447). These results bound operation at TPO conditions. EQ testing is performed using bounding pressure and temperature profiles with peak values of 62 psig and 340°F, which bound the accident pressure and temperature conditions for TPO.

Design basis accident containment humidity is conservatively assumed to be 100% for 100 days. EQ equipment is tested to 100% humidity.

The current normal radiation dose is based on a core thermal power of 3952 MWt and a plant life of 60 years. Any actual increases in normal dose rates are bounded by analyzed dose rates.

The design basis accident containment radiation conditions were determined for EPU using a core thermal power of 3917 MWt (1.02 x 3840 MWt). This value bounds the TPO uprate power level, including heat balance uncertainty.

The existing analyses bound operation at TPO conditions. All EQ electrical equipment remains qualified for TPO uprate conditions under normal and accident conditions.

**EEOB-3**

Section 3.4.5, "Grid Stability Studies," of Enclosure 1 of the LAR states:

Grid stability studies were performed for Hope Creek operation at a bounding electrical power output of 1320 [Megawatts electrical] MWe. These results bound operation at the proposed MUR power level of 3902 [Megawatts thermal] MWt."

The licensee has not provided the proposed MUR power level in MWe to allow the staff to verify that the MWe used for the grid studies is bounding for the TPO uprate.

Provide the value of the MWe power corresponding to the proposed MUR power level of 3902 MWt and include uncertainties, if any.

**Response:**

The existing grid stability study determines operating curves for the Hope Creek generator under multiple postulated grid conditions. This study provides operating curves with a maximum MWe output of 1320 MWe under normal conditions. Existing operating procedures direct control room operators to maintain electrical output below the operating curves.

The relationship between core thermal power and generator MWe output is dependent on multiple variables, primarily circulating water inlet temperature. At the current licensed thermal power (CLTP) of 3840 MWt, generator output has historically varied between approximately 1220 MWe and 1306 MWe. Under TPO power uprate conditions, approximately 20 additional MWe are expected. If plant conditions allow generator output to approach 1320 MWe, operators will decrease reactor power to maintain the generator output below the allowed operating curves.