

**Attachment 3 Contains Proprietary Information to be
Withheld from Public Disclosure Pursuant to 10 CFR 2.390**

PSEG Nuclear LLC

P.O. Box 236, Hancocks Bridge, NJ 08038-0236



10 CFR 50.90

DEC 19 2017

LR-N17-0181
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, "EICB Request for Additional Information - Hope Creek Power Uprate," dated November 21, 2017 (ADAMS Accession No. ML17331A007)

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 the Reference 2 e-mail, 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.

This letter provides the requested information in Attachment 1 (Non-Proprietary) and Attachment 3 (Proprietary).

**Attachment 3 Contains Proprietary Information to be
Withheld from Public Disclosure Pursuant to 10 CFR 2.390**

Page 2
LR-N17-0181

10 CFR 50.90

Attachment 3 contains proprietary information as defined by 10 CFR 2.390. GE-Hitachi Nuclear Energy Americas LLC (GEH), as the owner of the proprietary information, has executed an affidavit (provided in Attachment 2) identifying that the proprietary information has been handled and classified as proprietary, is customarily held in confidence, and has been withheld from public disclosure. GEH requests that the proprietary information in Attachment 3 be withheld from public disclosure, in accordance with the requirements of 10 CFR 2.390(a)(4).

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 12/19/17
(Date)

Respectfully,

A handwritten signature in black ink, appearing to read 'Eric Carr', followed by a horizontal line.

Eric Carr
Site Vice President
Hope Creek Generating Station

**Attachment 3 Contains Proprietary Information to be
Withheld from Public Disclosure Pursuant to 10 CFR 2.390**

DEC 19 2017
Page 3
LR-N17-0181

10 CFR 50.90

Attachments

1. Response to EICB Request for Additional Information Regarding MUR Power Uprate – Non-Proprietary (GEH Reference DOC-0006-0106-087 Attachment 2)
2. GEH Affidavit supporting the withholding of information in Attachment 3 from public disclosure
3. Response to EICB Request for Additional Information Regarding MUR Power Uprate - GEH Proprietary Information (GEH Reference DOC-0006-0106-087 Attachment 1)

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 EICB Request for Additional Information Regarding MUR Power Uprate

Non-Proprietary

This is the non-proprietary version of Attachment 3 of this letter which has the proprietary information removed. Portions of the document that have been removed are indicated by white space inside open and closed brackets as shown here [[]].

(GEH Reference DOC-0006-0106-087 Attachment 2)

EICB-1

In the Section 5.1.1.3 of the LAR Enclosure 6, the licensee stated:

The rod block monitor (RBM) instrumentation is referenced to an APRM (Average Power Range Monitor) channel. Because the APRM has been rescaled, there is only a small effect on the RBM performance due to the LPRM (Local Power Range Monitor) performance at the higher average local flux. The RBM instrumentation is not significantly affected by the TPO (Thermal Power Optimization) uprate conditions, and no change is needed.

Please clarify what do “small effect” and “not significantly affected” mean. The clarification should use the justification and conclusion made by the NRC approved technical reports such as the NEDC-32938P-A, “Thermal Power Optimization Licensing Topical Report” (TLTR), NEDC-32424P-A, “Generic Guidelines for General Electric Boiling Water Reactor Extended Power Uprate” (ELTR1) or NEDC-32523P-A, “Generic Evaluations of General Electric Boiling Water Reactor Extended Power Uprate” (ELTR2); or use a qualitative and/or quantitative analysis. This information is needed to confirm that no change is needed to the RBM setpoint.

EICB -1 RESPONSE :

This statement is based on licensing topical report NEDC-33004P-A, “Constant Pressure Power Uprate,” Section 5.1.1.3. “LPRM performance” refers to accuracy, and per NEDC-33004P-A Section 5.1.1.2, LPRM accuracy remains within analyzed limits at uprate conditions. “Not significantly affected” means that the accuracy effect on the RBM due to the LPRMs is bounded by the analyzed performance of the RBM. As NEDC-33004P-A (Reference 1-1) is applicable to EPU uprated up to 120% of Original Licensed Thermal Power (OLTP) this statement is applicable to Hope Creek Generating Station (HCGS) at TPO conditions.

Additionally, Section 5.3.5 of NEDC-33004P-A states, “The severity of rod withdrawal error during power operation event is dependent upon the RBM rod block setpoint. This setpoint is only applicable to the control rod withdrawal error. [[

]]

Because the RBM trip setpoints are analyzed on a cycle-specific basis as part of the core reload analysis, no changes to any RBM Technical Specification setpoints are required as part of the TPO uprate.

Reference

- 1-1. GE Nuclear Energy, “Constant Pressure Power Uprate,” NEDC-33004P-A, Revision 4, July 2003.

EICB-2

The licensee stated that the HCGS TPO RWM Lower Power Setpoint (LPSP) Analytical Limit (AL) has been scaled in terms of percent power to maintain the value in absolute power. The licensee summarized in the LAR Enclosure 1, Table 2.1, Item 11, LCO 3.1.4.1 Applicability is revised from 8.6% to 8.5% Rate Thermal Power (RTP) as minimum allowable LPSP. The licensee also listed in the LAR Enclosure 6, NEDC-33871P, "Safety Analysis Report for Hope Creek Generating Station Thermal Power Optimization," Revision 0 (TSAR), Table 5-1 that the RWM LPSP – AL (%RTP) is changed from 8.576 to 8.441.

1. Please confirm whether these two items (Item 11 in Table 2.1 in LAR Enclosure 1 and the RWM LPSP – AL in Table 5.1 in TSAR) refer to the same parameter.
2. Please provide additional details on the calculation for the change of the RWM LPSP – AL (%RTP), to allow the NRC staff to confirm the proposed change from 8.576 to 8.441 using the decrease factor of Current Licensed Thermal Power (CLTP) RTP/TPO RTP (3840/3902).

EICB-2 RESPONSE:

1. LAR Enclosure 1, Table 2.1, Item 11 is the same parameter as the RWM LPSP – AL in Table 5.1 in the TSAR. In keeping with previous revisions of the Hope Creek Technical Specifications, this parameter has been conservatively rounded up from the value provided by GEH to the next 0.1% power.
2. For HCGS, the Rod Worth Minimizer (RWM) LPSP AL is [[
]], per Section F.4.2.9 of NEDC-32938P-A (Reference 2-1). Thus, the Thermal Power Optimization (TPO) AL decreases in terms of % RTP. [[
]]

The change in the RWM LPSP AL can be calculated two ways:

- (a) based on the published TPO increase of 1.6% RTP (NEDC-33871P (Reference 2-2)):

$$(8.576 / 1.016) = 8.4409$$

The calculation results are rounded up for conservatism to 8.441 % RTP.

and

- (b) based on the ratio of the change in RTP from 3,840 MW_{Th} to 3,902 MW_{Th}:

$$(8.576) / (3,902/3,840) = 8.4397$$

The calculation results are rounded up for conservatism to 8.440 % RTP.

The larger of these two calculated ALs (i.e., 8.441 % RTP) was chosen for the HCGS TPO, for conservatism.

Thus, the RWM rod withdrawal blocks enforcement will be based on a conservative change in the AL for TPO.

References

- 2-1. GE Nuclear Energy, "Generic Guidelines and Evaluations for General Electric Boiling Water Reactor Thermal Power Optimization," NEDC-32938P-A, Revision 2, May 2003.
- 2-2. GE Hitachi Nuclear Energy, "Safety Analysis Report for Hope Creek Generating Station Thermal Power Optimization," NEDC-33871P, Revision 0, April 2017.

EICB- 3

The licensee summarized the change of the Single Loop Operation (SLO) Simulated Thermal Power (STP) Upscale Rod Block Nominal Trip Setpoint (NTSP) (%RTP) from 0.57 (Wd-10.6) + 54.0 to 0.56(Wd-10.8) + 53.1 in LAR Enclosure 1, Table 2.1 Item 14. Please provide the calculation details for the change of the feedwater offset from 10.6 to 10.8.

EICB-3 RESPONSE:

Note that this question is actually discussing the recirculation offset as it pertains to the Average Power Range Monitor (APRM) STP flow-biased scram and rod block NTSPs, rather than the stated feedwater offset. These NTSPs are listed in items No. 8 and 14, respectively, in Enclosure 1 of the HCGS License Amendment Request (Reference 3-1).

Background:

For HCGS, the ΔW equals 9% drive flow. The ΔW is used in the APRM STP Allowable Value (AV) equations.

However, the APRM STP NTSP equations must account for increased flow errors in the idle loop while in SLO. Hence, a SLO to Two Loop Operation (TLO) setting adjustment ($SLO_{SettingAdj}$) is used in the NTSP equations that is larger than the ΔW . [[

]] If only ΔW was used in the SLO equations, then a different intercept in the SLO NTSP equations would be needed, as shown in the example APRM STP scram and rod block equations below (in units of % Rated Thermal Power (RTP) and where W_d is the % recirculation drive flow, where 100% drive flow is required at 100% core power and flow):

TLO NTSP Equations

Parameter	Equation
CLTP	
APRM STP – Upscale, Flow Biased – TLO (Scram)	$0.57W_d + 59$
APRM STP – Upscale, Flow Biased – TLO (Rod Block)	$0.57W_d + 54$
TPO	
APRM STP – Upscale, Flow Biased – TLO (Scram)	$0.56W_d + 58$
APRM STP – Upscale, Flow Biased – TLO (Rod Block)	$0.56W_d + 53.1$

SLO NTSP Equations

Parameter	Equation with ΔW	Equation with $SLO_{SettingAdj}$
CLTP		
APRM STP – Upscale, Flow Biased – SLO (Scram)	$0.57(W_d - \Delta W) + 58.1$ $0.57(W_d - 9) + 58.1$ $= 0.57W_d + 52.97$	$0.57(W_d - SLO_{SettingAdj}) + 59$ $0.57(W_d - 10.6) + 59$
APRM STP – Upscale, Flow Biased – SLO (Rod Block)	$0.57(W_d - \Delta W) + 53.1$ $0.57(W_d - 9) + 53.1$ $= 0.57W_d + 47.97$	$0.57(W_d - SLO_{SettingAdj}) + 54$ $0.57(W_d - 10.6) + 54$
TPO		
APRM STP – Upscale, Flow Biased – SLO (Scram)	$0.56(W_d - \Delta W) + 57$ $0.56(W_d - 9) + 57$ $= 0.56W_d + 51.97$	$0.56(W_d - SLO_{SettingAdj}) + 58$ $0.56(W_d - 10.8) + 58$
APRM STP – Upscale, Flow Biased – SLO (Rod Block)	$0.56(W_d - \Delta W) + 52.1$ $0.56(W_d - 9) + 52.1$ $= 0.56W_d + 47.07$	$0.56(W_d - SLO_{SettingAdj}) + 53.1$ $0.56(W_d - 10.8) + 53.1$

Note that the ordinate (at zero recirculation flow) remains the same for TLO and SLO when the SLO to TLO setting adjustment ($SLO_{SettingAdj}$) is used in the NTSP equations. For example, the APRM STP rod block uses 54 for both TLO and SLO for CLTP conditions. It uses 53.1 for both TLO and SLO for TPO conditions.

Calculation of SLO to TLO Setting Adjustment ($SLO_{SettingAdj}$):

CLTP Conditions:

The scram TLO NTSP is $0.57W_d + 59\%$, with an intercept of 59. The scram SLO NTSP is $0.57W_d + 52.97\%$, with an intercept of 52.97. For the SLO flow biased STP scram NTSP of $0.57W_d + 52.97\%$, the SLO NTSP intercept [[

]] The resulting TLO to SLO setting adjustment is 10.5789.

Because the setting adjustment is programmed into the NUMAC™ equipment to one decimal place, the calculated number is rounded up to one decimal place for conservatism to 10.6. Thus, the resulting APRM flow biased STP NTSPs set into the equipment will be slightly more conservative than the numbers reported.

TPO Conditions:

The scram TLO NTSP is $0.56W_d + 58\%$, with an intercept of 58. The scram SLO NTSP is $0.56W_d + 51.97\%$, with an intercept of 51.97. For the SLO flow biased STP scram NTSP of $0.56W_d + 51.97\%$, the SLO NTSP intercept [[

]] The resulting TLO to SLO setting adjustment is 10.7679. Again, this calculated number is rounded up to one decimal place for conservatism to 10.8 for programming into the NUMAC™ equipment.

Calculations of the TLO to SLO setting adjustments for both the CLTP and TPO rod block NTSP equations provide the same results as for the associated scram NTSPs shown above.

The APRM STP scram and rod withdrawal block NTSPs are based on use of a conservative SLO to TLO setting adjustment ($SLO_{SettingAdj}$). This SLO to TLO setting adjustment changes slightly for TPO conditions because of the slight changes in the TLO and SLO NTSPs.

Reference

- 3-1. Letter, Eric Carr (PSEG) to NRC Document Control Desk, "License Amendment Request for Measurement Uncertainty Recapture (MUR) Power Uprate," LR-N17-0044, LAR H17-03, July 17, 2017.

**GEH Affidavit supporting the withholding of information in Attachment 3 from
public disclosure**

GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, **Lisa K. Schichlein**, state as follows:

- (1) I am a Senior Project Manager, NPP/Services Licensing, Regulatory Affairs, GE-Hitachi Nuclear Energy Americas LLC ("GEH"), and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.
- (2) The information sought to be withheld is contained in Attachment 1 of GEH letter, DOC-0006-0106-087, "GEH Response to NRC TPO EICB RAIs in Support of the Hope Creek TPO LAR," dated December 7, 2017. The GEH proprietary information in Attachment 1, which is entitled "Response to EICB RAIs in Support of the Hope Creek TPO LAR," is identified by a dotted underline inside double square brackets. ~~[[This sentence is an example.]]~~⁽³⁾ In each case, the superscript notation ⁽³⁾ refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.
- (3) In making this application for withholding of proprietary information of which it is the owner or licensee, GEH relies upon the exemption from disclosure set forth in the *Freedom of Information Act* ("FOIA"), 5 U.S.C. Sec. 552(b)(4), and the *Trade Secrets Act*, 18 U.S.C. Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.390(a)(4) for trade secrets (Exemption 4). The material for which exemption from disclosure is here sought also qualifies under the narrower definition of trade secret, within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975 F.2d 871 (D.C. Cir. 1992), and Public Citizen Health Research Group v. FDA, 704 F.2d 1280 (D.C. Cir. 1983).
- (4) The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a. and (4)b. Some examples of categories of information that fit into the definition of proprietary information are:
 - a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GEH's competitors without license from GEH constitutes a competitive economic advantage over other companies;
 - b. Information that, if used by a competitor, would reduce their expenditure of resources or improve their competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;
 - c. Information that reveals aspects of past, present, or future GEH customer-funded development plans and programs, resulting in potential products to GEH;
 - d. Information that discloses trade secret or potentially patentable subject matter for which it may be desirable to obtain patent protection.
- (5) To address 10 CFR 2.390(b)(4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GEH,

GE-Hitachi Nuclear Energy Americas LLC

and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GEH, not been disclosed publicly, and not been made available in public sources. All disclosures to third parties, including any required transmittals to the NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary or confidentiality agreements that provide for maintaining the information in confidence. The initial designation of this information as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in the following paragraphs (6) and (7).

- (6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, who is the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or who is the person most likely to be subject to the terms under which it was licensed to GEH.
- (7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist, or other equivalent authority for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GEH are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary or confidentiality agreements.
- (8) The information identified in paragraph (2), above, is classified as proprietary because it contains detailed GEH methodology for thermal power optimization for GEH Boiling Water Reactors (BWRs). Development of these methods, techniques, and information and their application for the design, modification, and analyses methodologies and processes was achieved at a significant cost to GEH.

The development of the evaluation processes along with the interpretation and application of the analytical results is derived from the extensive experience and information databases that constitute a major GEH asset.

- (9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GEH's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GEH's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GEH. The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial. GEH's competitive advantage will be lost if its competitors are able to use the results of the GEH experience to normalize or verify their

GE-Hitachi Nuclear Energy Americas LLC

own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GEH would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GEH of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining these very valuable analytical tools.

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

Executed on this 6th day of December 2017.



Lisa K. Schichlein
Senior Project Manager, NPP/Services Licensing
Regulatory Affairs
GE-Hitachi Nuclear Energy Americas LLC
3901 Castle Hayne Road
Wilmington, NC 28401
Lisa.Schichlein@ge.com