



10 CFR 50.90

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**FEB 27 2019**

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: **Application to Revise Technical Specifications to Adopt TSTF-546, "Revise APRM Channel Adjustment Surveillance Requirement"**

Pursuant to 10 CFR 50.90, PSEG Nuclear LLC is submitting a request for an amendment to the Technical Specifications (TS) for Hope Creek Generating Station.

The proposed change is consistent with TSTF-546, "Revise APRM Channel Adjustment Surveillance Requirement." The proposed amendment alters Surveillance Requirement (SR) 4.3.1.1 of Technical Specification (TS) 3.3.1, "Reactor Protection System Instrumentation." This proposed change revises the SR to verify that calculated (i.e.; calorimetric heat balance) power is no more than 2% greater than the average power range monitor (APRM) channel output. The SR requires the APRM channel to be adjusted such that calculated power is no more than 2% greater than the APRM indicated power when operating at  $\geq 24\%$  of Rated Thermal Power (RTP). This change revises the SR to distinguish between APRM indications that are consistent with the accident analyses and those that provide additional margin.

Attachment 1 provides a description and assessment of the proposed changes.  
Attachment 2 provides the existing TS page marked up to show the proposed changes.  
Attachment 3 provides the revised (clean) TS page.  
Attachment 4 provides the TS Bases page marked up to show the associated TS Bases changes and is provided for information only.

Approval of the proposed amendment is requested in accordance with standard NRC approval process and schedule. Once approved, the amendment shall be implemented within 60 days from the date of issuance.

In accordance with 10 CFR 50.91(b)(1), a copy of this applications, with attachments, is being provided to the designated State of New Jersey Official.

There are no regulatory commitments contained in this letter.

If you have any questions or require additional information, please contact Mr. Michael Wiwel at 856-339-7907.

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

Executed on 2/26/19  
(Date)

Respectfully,



Eric Carr  
Vice President – Hope Creek Generating Station  
PSEG Nuclear

Attachments: 1. Description and Evaluation of the Proposed Change  
2. Proposed Technical Specification Changes (Mark-Up)  
3. Revised Technical Specification Page  
4. Proposed Technical Specification Bases Changes (Mark-Up) – Information Only

cc: Mr. D. Lew, Administrator, Region I, NRC  
Mr. J. Kim, NRC Project Manager, Salem & Hope Creek  
NRC Senior Resident Inspector, Hope Creek  
Mr. J. Humphreys, NJBNE  
Hope Creek Commitment Coordinator

Description and Evaluation of the Proposed Change

Application to Revise Technical Specifications to Adopt TSTF-546 “Revise APRM  
Channel Adjustment Surveillance Requirement”

Table of Contents

1. DESCRIPTION.....2

2. ASSESSMENT.....2

2.1 Applicability .....2

2.2 Variations .....2

3. REGULATORY ANALYSIS .....3

3.1 No Significant Hazards Consideration Analysis .....3

3.2 Conclusions.....4

4. ENVIRONMENTAL EVALUATION .....5

## **1.0 DESCRIPTION**

The proposed amendment alters Surveillance Requirement (SR) 4.3.1.1 of Technical Specification (TS) 3.3.1, "Reactor Protection System Instrumentation." This proposed change revises the SR to compare calculated (i.e. calorimetric heat balance) power to the average power range monitor (APRM) indications, and to adjust the APRM consistent with the heat balance power if the calculated power is more than 2% greater than the APRM channel output when operating at  $\geq 24\%$  of Rated Thermal Power (RTP). This change revises the SR to require adjustment only if the APRM indication deviates from the calculated power in the nonconservative direction.

## **2.0 ASSESSMENT**

### **2.1 Applicability**

PSEG Nuclear LLC (PSEG) has reviewed the safety evaluation provided to the Technical Specifications Task Force in a letter dated August 31, 2017 (NRC ADAMS Accession No. ML17206A431). This included a review of the NRC staff's evaluation, as well as the information provided in TSTF-546. As described herein, PSEG has concluded that the justifications, plant design description, and safety analysis description presented in TSTF-546 and the safety evaluation prepared by the NRC staff are applicable to Hope Creek Generating Station (HCGS) and justify this amendment for the incorporation of the changes to the Hope Creek TS.

### **2.2 Variations**

PSEG is proposing the following variations from the TS changes described in the TSTF-546, Revision 0, or the NRC staff's safety evaluation dated August 31, 2017. These variations do not affect the applicability of TSTF-546 or the NRC staff's safety evaluation to the proposed license amendment.

The HCGS TS utilize different numbering than the Standard Technical Specifications on which TSTF-546 was based. Specifically, the SR associated with RPS Instrumentation is governed by SR 4.3.1.1 and the SR requirements for specific RPS instruments are delineated in TS Table 4.3.1.1-1, Reactor Protection System Instrumentation Surveillance Requirements. TS Table 4.3.1.1-1 identifies the applicable SRs for Functional Unit 2.b (APRM Simulated Thermal Power-Upscale) and Functional Unit 2.c (APRM Neutron Flux – Upscale). Note 'd', which is uniquely associated with these two Functional Units, describes the requirements for calibration of the APRMs to conform to a calculated heat balance. These differences are administrative and do not affect the applicability of TSTF-546 to HCGS.

Additionally, TSTF-546 identifies applicability of the subject SR when the reactor is operating at  $\geq 25\%$  RTP. HCGS has established a range of  $\geq 24\%$  RTP for performance of this SR. The  $\geq 24\%$  RTP range of applicability results in earlier performance of the surveillance during reactor startup which is conservative.

### 3.0 REGULATORY ANALYSIS

#### 3.1 No Significant Hazards Consideration Analysis

PSEG requests adoption of TSTF-546, Revision 0, "Revise APRM Channel Adjustment Surveillance Requirement," which is an approved change to the standard technical specifications (STS), into the Hope Creek Generating Station (HCGS) Technical Specifications (TS). The proposed change alters Surveillance Requirement (SR) 4.3.1.1 of TS 3.3.1, "Reactor Protection System Instrumentation," specifically, Table 4.3.1.1-1, "Reactor Protection System Instrumentation Surveillance Requirements." This proposed change revises the SR for Functional Unit 2.b (Average Power Range Monitor (APRM) Simulated Thermal Power-Upscale) and Functional Unit 2.c (APRM Neutron Flux - Upscale) to compare the calculated (i.e.; calorimetric heat balance) power to the APRM indications, and to adjust the APRM consistent with the heat balance power if the calculated power is more than 2% greater than the APRM channel output when operating at  $\geq 24\%$  of Rated Thermal Power (RTP). This change revises the SR to require adjustment only if the APRM indication deviates from the calculated power in the nonconservative direction.

The proposed change has been evaluated against the criteria of 10 CFR 50.92(c) to determine if the proposed change results in any significant hazards. The following is the analysis of each of the 10 CFR 50.92(c) criteria:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

**Response: No**

The APRM system and the RPS are not initiators of any accidents previously evaluated. As a result, the proposed change does not affect the probability of any accident previously evaluated. The APRM system and the Reactor Protection System (RPS) functions act to mitigate the consequences of accidents previously evaluated. The reliability of APRM system and the RPS is not significantly affected by removing the gain adjustment requirement on the APRM channels when the APRMs are calibrated conservatively with respect to the calculated heat balance. This is because the actual core thermal power at which the reactor will automatically trip is lower, thereby increasing the margin to the core thermal limits and the limiting safety system settings assumed in the safety analyses. The consequences of an accident during the adjustment of the APRM instrumentation are no different from those during the existing surveillance testing period or the existing time allowed to restore the instruments to operable status. As a result, the ability of the APRM system and the RPS to mitigate any accident previously evaluated is not significantly affected.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any previously evaluated?

**Response: No**

The proposed change does not alter the protection system design, create new failure modes, or change any modes of operation. The proposed change does not involve a physical alteration of the plant; no new or different kind of equipment will be installed. Consequently, there are no new initiators that could result in a new or different kind of accident.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

**Response: No**

The margin of safety provided by the APRM system and the RPS is to ensure that the reactor is shut down automatically when plant parameters exceed the setpoints for the system. Any reduction in the margin of safety resulting from the adjustment of the APRM channels while continuing operation is considered to be offset by delaying a plant shutdown (i.e., a transient) for a short time with the APRM system, the primary indication of core power and an input to the RPS, not calibrated. Additionally, the short time period required for adjustment is consistent with the time allowed by Technical Specifications to restore the core power distribution parameters to within limits and is acceptable based on the low probability of a transient or design basis accident occurring simultaneously with inaccurate APRM channels.

The proposed change does not alter setpoints or limits established or assumed by the accident analyses. The Technical Specifications continue to require operability of the RPS functions, which provide core protection for postulated reactivity insertion events occurring during power operating conditions consistent with the plant safety analyses.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, PSEG concludes that the proposed amendment presents no significant hazards considerations under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

### **3.2 Conclusions**

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

**4.0 ENVIRONMENTAL EVALUATION**

The proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

**Mark-up of Proposed Technical Specification Page**

The following Technical Specifications page for Renewed Facility Operating License NPF-57 is affected by this change request:

<b><u>Technical Specification</u></b>	<b><u>Page</u></b>
Table 4.3.1.1-1, "Reactor Protection System Instrumentation Surveillance Requirements"	3/4 3-7 (For Information) 3/4 3-8



No Changes on this Page - Provided for Information Only

TABLE 4.3.1.1-1

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK <sup>(m)</sup>	CHANNEL FUNCTIONAL TEST <sup>(m)</sup>	CHANNEL CALIBRATION <sup>(a)(m)</sup>	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
1. Intermediate Range Monitors:				
a. Neutron Flux - High	(b)			2 3, 4, 5
b. Inoperative	NA		NA	2, 3, 4, 5
2. Average Power Range Monitor <sup>(b)</sup> :				
a. Neutron Flux - Upscale (Setdown)	(b)	(f)	(n), (o)	2
b. Simulated Thermal Power-Upscale	(g)	(e)	(d), (g), (n), (o)	1
c. Neutron Flux - Upscale			(d), (n), (o)	1
d. Inoperative	NA		NA	1, 2
e. 2-Out-Of-4 Voter			NA	1, 2
f. OPRM Upscale		(e)	(g)	≥ 19% RTP
3. Reactor Vessel Steam Dome Pressure - High		(c)		1, 2
4. Reactor Vessel Water Level - Low, Level 3		(c)		1, 2
5. Main Steam Line Isolation Valve - Closure	NA			1
6. This item intentionally blank				
7. Drywell Pressure - High		(a)		1, 2

**TABLE 4.3.1.1-1 (Continued)**  
**REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS**

<u>FUNCTIONAL UNIT</u>	<u>CHANNEL CHECK (m)</u>	<u>CHANNEL FUNCTIONAL TEST (n)</u>	<u>CHANNEL CALIBRATION (n)</u>	<u>OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED</u>
8. Scram Discharge Volume Water Level - High:				
a. Float Switch	NA			1, 2, 5 <sup>(d)</sup>
b. Level Transmitter/Trip Unit		(n)		1, 2, 5 <sup>(d)</sup>
9. Turbine Stop Valve - Closure	NA			1
10. Turbine Control Valve Fast Closure Valve Trip System Oil Pressure - Low	NA			1
11. Reactor Mode Switch Shutdown Position	NA		NA	1, 2, 3, 4, 5
12. Manual Scram	NA		NA	1, 2, 3, 4, 5

- (a) Neutron detectors may be excluded from CHANNEL CALIBRATION.
- (b) The IRM and SRM channels shall be determined to overlap for at least 1/2 decades during each startup after entering OPERATIONAL CONDITION 2 and the IRM and APRM channels shall be determined to overlap for at least 1/2 decades during each controlled shutdown, if not performed within the previous 7 days.
- (c) DELETED
- (d) This calibration shall consist of the adjustment of the APRM channel to conform to the power values calculated by a heat balance during OPERATIONAL CONDITION 1 when THERMAL POWER  $\geq$  24% of RATED THERMAL POWER. Adjust the APRM channel if the absolute difference is greater than 2% of RATED THERMAL POWER.
- (e) The CHANNEL FUNCTIONAL TEST includes the recirculation flow input function, excluding the flow transmitters.
- (f) The LPRMs shall be calibrated in accordance with the Surveillance Frequency Control Program.
- (g) Calibration includes the flow input function.
- (h) Deleted.
- (i) This item intentionally blank.
- (j) With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.
- (k) Verify the trip setpoint of the trip unit in accordance with the Surveillance Frequency Control Program.
- (l) Not required to be performed when entering OPERATIONAL CONDITION 2 from OPERATIONAL CONDITION 1 until 12 hours after entering OPERATIONAL CONDITION 2.
- (m) Frequencies are specified in the Surveillance Frequency Control Program unless otherwise noted in the table.

**Proposed Technical Specification Page**

The following Technical Specifications page for Renewed Facility Operating License NPF-57 is affected by this change request:

<b><u>Technical Specification</u></b>	<b><u>Page</u></b>
Table 4.3.1.1-1, "Reactor Protection System Instrumentation Surveillance Requirements"	3/4 3-8

TABLE 4.3.1.1-1 (Continued)  
REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>FUNCTIONAL UNIT</u>	<u>CHANNEL CHECK <sup>(m)</sup></u>	<u>CHANNEL FUNCTIONAL TEST <sup>(m)</sup></u>	<u>CHANNEL CALIBRATION <sup>(m)</sup></u>	<u>OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED</u>
8. Scram Discharge Volume Water Level - High:				
a. Float Switch	NA			1, 2, 5 <sup>(j)</sup>
b. Level Transmitter/ Trip Unit		(k)		1, 2, 5 <sup>(j)</sup>
9. Turbine Stop Valve - Closure	NA			1
10. Turbine Control Valve Fast Closure Valve Trip System Oil Pressure - Low	NA			1
11. Reactor Mode Switch Shutdown Position	NA		NA	1, 2, 3, 4, 5
12. Manual Scram	NA		NA	1, 2, 3, 4, 5

- (a) Neutron detectors may be excluded from CHANNEL CALIBRATION.
- (b) The IRM and SRM channels shall be determined to overlap for at least 1/2 decades during each startup after entering OPERATIONAL CONDITION 2 and the IRM and APRM channels shall be determined to overlap for at least 1/2 decades during each controlled shutdown, if not performed within the previous 7 days.
- (c) DELETED
- (d) This calibration shall consist of the adjustment of the APRM channel to conform to the power values calculated by a heat balance during OPERATIONAL CONDITION 1 when THERMAL POWER  $\geq$  24% of RATED THERMAL POWER. Adjust the APRM channel if the calculated power exceeds the APRM output by greater than 2% of RATED THERMAL POWER.
- (e) The CHANNEL FUNCTIONAL TEST includes the recirculation flow input function, excluding the flow transmitters.
- (f) The LPRMs shall be calibrated in accordance with the Surveillance Frequency Control Program.
- (g) Calibration includes the flow input function.
- (h) Deleted.
- (i) This item intentionally blank
- (j) With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.
- (k) Verify the trip setpoint of the trip unit in accordance with the Surveillance Frequency Control Program.
- (l) Not required to be performed when entering OPERATIONAL CONDITION 2 from OPERATIONAL CONDITION 1, until 12 hours after entering OPERATIONAL CONDITION 2.
- (m) Frequencies are specified in the Surveillance Frequency Control Program unless otherwise noted in the table.

**Mark-up of Proposed Technical Specification Bases Page**

The following Technical Specification Bases page for Renewed Facility Operating License NPF-57 is affected by this change request:

**Technical Specification Bases**

**Page**

TS 3/4.3.1

B 3/4 3-1d

## INSTRUMENTATION

### BASES

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An OPRM Upscale trip is issued from an OPRM channel when the CDA in that channel detects oscillatory changes in the neutron flux, indicated by period confirmations and amplitude exceeding specified setpoints for a specified number of OPRM cells in the channel. An OPRM Upscale trip is also issued from the channel if any of the defense-in-depth algorithms (PBDA, ABA, GRA) exceeds its trip condition for one or more cells in that channel.

Three of the four channels are required to be operable. Each channel is capable of detecting thermal-hydraulic instabilities, by detecting the related neutron flux oscillations, and issuing a trip signal before the SLMCPR is exceeded.

The OPRM Upscale Function is not LSSS SL-related (Reference 3) and Reference 4 confirms that the OPRM Upscale Function settings based on DSS-CD also do not have traditional instrumentation setpoints determined under an instrument setpoint methodology.

#### TS 3.3.1 Actions

##### a and b

For APRM functions 2.a, 2.b, 2.c, 2.d, and 2.f, ACTION a. is the only applicable action (ACTION b. is noted as not applicable per Note \*\*). For these functions the four APRM channels produce trips that are voted in both trip systems, with two votes being required to initiate the trip. Three OPERABLE channels are required to meet single failure criteria. If one required APRM channel is INOPERABLE, single failure criteria is not met in both trip systems, therefore placing one trip system in trip does not restore single failure criteria for the function. However, placing the affected APRM channel in trip does restore single failure criteria for the function in both trip systems by inserting one vote for the affected functions in all voters, requiring only a single additional vote to initiate a scram in both trip systems. Therefore, for these functions, Note \*\*\* specifies that the channel (not the trip system) be placed in a tripped condition.

If two required APRM channels are INOPERABLE, ACTION a. requires placing both channels in trip, which would initiate the protective action. The provisions of Note \* apply and only one channel must be placed in a tripped condition. The second channel must be restored to OPERABLE status within 6 hours or the ACTION required by Table 3.3.1-1 for the affected trip functions shall be taken.

For APRM function 2.e, TS 3.3.1 ACTION a. and b. apply as they would for any other RPS channel.

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##### TSTF-493

For Functions 2.a, 2.b and 2.c, the CHANNEL CALIBRATION surveillance requirement is modified by two Notes. The first Note requires evaluation of channel performance for the condition where the as-found setting for the channel setpoint is outside its as-found tolerance but conservative with respect to the Allowable Value. Evaluation of channel performance will verify that the channel will continue to behave in accordance with safety analysis assumptions and the channel performance assumptions in the setpoint methodology. The purpose of the assessment is to ensure confidence in the channel performance prior to returning the channel to service. For channels determined to be OPERABLE but degraded, after returning the channel to service the performance of these channels will be evaluated under the plant Corrective Action Program. Entry into the Corrective Action Program will ensure required review and documentation of the condition. The second Note requires that the as-left setting for the channel be within the as-left tolerance of the Trip Setpoint. The as-left and as-found tolerances, as applicable, will be applied to the surveillance procedure setpoint. This will ensure that sufficient margin to the Safety Limit and/or Analytical Limit is maintained. If the as-left channel setting cannot be returned to a setting within the as-left tolerance of the Trip Setpoint, then the channel shall be declared inoperable. The as-left tolerance for this function is calculated using the square-root-sum-of-squares of the reference accuracy and the measurement and test equipment error (including readability). The as-found tolerance for this function is calculated using the square-root-sum-of-squares of the reference accuracy, instrument drift, and the measurement and test equipment error (including readability).

**Insert-1**

To ensure that the APRMs are accurately indicating the true core average power, the APRMs are adjusted to the reactor power calculated from a heat balance if the heat balance calculated reactor power exceeds the APRM channel output by more than 2% RTP when operating at or above 24% RTP. If the heat balance calculated reactor power exceeds the APRM channel output by more than 2% RTP, the APRM is not declared inoperable, but must be adjusted consistent with the heat balance calculated power. If the APRM channel output cannot be properly adjusted, the channel is declared inoperable.

This Surveillance does not preclude making APRM channel adjustments, if desired, when the heat balance calculated reactor power is less than the APRM channel output. To provide close agreement between the APRM indicated power and to preserve operating margin, the APRM channels are normally adjusted to within +/- 2% of the heat balance calculated reactor power. However, this adjustment is not required for OPERABILITY when APRM output indicates a higher reactor power than the heat balance calculated reactor power.