UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 17, 2015

Mr. Robert Braun
President and Chief Nuclear Officer
PSEG Nuclear LLC - N09
P.O. Box 236
Hancocks Bridge, NJ 08038

SUBJECT: HOPE CREEK GENERATING STATION – SUPPLEMENTAL INFORMATION NEEDED FOR ACCEPTANCE OF REQUESTED LICENSING ACTION RE: AMENDMENT REQUEST REGARDING DIGITAL POWER RANGE NEUTRON MONITORING SYSTEM UPGRADE (CAC NO. MF6768)

Dear Mr. Braun:

By letter dated September 21, 2015 (Agencywide Documents Access and Management System Package Accession No. ML15265A223), PSEG Nuclear LLC (PSEG) submitted a license amendment request for the Hope Creek Generating Station. The proposed amendment would allow the replacement and upgrade of the existing analog Average Power Range Monitor sub-system of the Neutron Monitoring System with General Electric-Hitachi digital Nuclear Measurement Analysis and Control Power Range Neutron Monitoring (PRNM) system. The PRNM upgrade also includes Oscillation Power Range Monitor capability and will allow full Average Power Range Monitor, Rod Block Monitor, Technical Specification Improvement Program implementation, and will include application of Technical Specification Task Force Traveler-493, Revision 4, "Clarify Application of Setpoint Methodology for LSSS [Limiting Safety System Setting] Functions," to affected PRNM functions.

The purpose of this letter is to provide the results of the U.S. Nuclear Regulatory Commission (NRC) staff's acceptance review of this amendment request. The acceptance review was performed to determine if there is sufficient technical information in scope and depth to allow the NRC staff to complete its detailed technical review. The acceptance review is also intended to identify whether the application has any readily apparent information insufficiencies in its characterization of the regulatory requirements or the licensing basis of the plant.

Consistent with Section 50.90 of Title 10 of the *Code of Federal Regulations* (10 CFR), an amendment to the license (including the technical specifications) must fully describe the changes requested, and following as far as applicable, the form prescribed for original applications. Section 50.34 of 10 CFR addresses the content of technical information required. This section stipulates that the submittal address the design and operating characteristics, unusual or novel design features, and principal safety considerations.

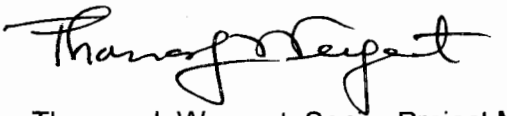
The NRC staff has reviewed your application and concluded that the information delineated in the enclosure to this letter is necessary to enable the staff to make an independent assessment regarding the acceptability of the proposed amendment in terms of regulatory requirements and the protection of public health and safety and the environment.

In order to make the application complete, the NRC staff requests that PSEG supplement the application to address the information requested in the enclosure. A draft version of this request was discussed with your staff in a conference call on November 4, 2015. Please provide your response to this request by November 24, 2015 (i.e., within 13 business days of the date of the conference call). This will enable the NRC staff to begin its detailed technical review. If the response to the NRC staff's request is not received by the above date, the application will not be accepted for review pursuant to 10 CFR 2.101, and the NRC will cease its review activities associated with the application. If the application is subsequently accepted for review, you will be advised of any further information needed to support the staff's detailed technical review by separate correspondence.

As noted above, the information requested and associated timeframe in this letter were discussed with Mr. Brian Thomas of your staff on November 4, 2015.

If you have any questions, please contact me at (301) 415-4037 or Thomas.Wengert@nrc.gov.

Sincerely,



Thomas J. Wengert, Senior Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-354

Enclosure:
Supplemental Information Needed

cc w/enclosure: Distribution via Listserv

SUPPLEMENTAL INFORMATION NEEDED

LICENSE AMENDMENT REQUEST

PSEG NUCLEAR LLC

HOPE CREEK GENERATING STATION

DOCKET NO. 50-354

By letter dated September 21, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15265A223), PSEG Nuclear LLC (PSEG) submitted a license amendment request (LAR) for the Hope Creek Generating Station (HCGS). The proposed amendment would allow the replacement and upgrade of the existing analog Average Power Range Monitor (APRM) sub-system of the Neutron Monitoring System with General Electric-Hitachi digital Nuclear Measurement Analysis and Control (NUMAC) Power Range Neutron Monitoring (PRNM) system. The PRNM upgrade also includes Oscillation Power Range Monitor (OPRM) capability and will allow full Average Power Range Monitor, Rod Block Monitor, Technical Specification (TS) Improvement Program implementation, and will include application of Technical Specification Task Force Traveler-493, Revision 4, "Clarify Application of Setpoint Methodology for LSSS [Limited Safety System Setting] Functions," to affected PRNM functions. The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed your application and concluded that the supplemental information delineated below is necessary to enable the staff to make an independent assessment regarding the acceptability of the proposed amendment.

Background/Regulatory Basis

In January 2011, the NRC issued Interim Staff Guidance (ISG) Digital I&C [Instrumentation and Control]-ISG-06, "Task Working Group #6: Licensing Process," Revision 1 (ADAMS Accession No. ML110140103), which describes the licensing process that may be used in the review of LARs associated with digital I&C system modifications in operating plants originally licensed under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50. Section C.3, "Initial Application (Phase 1) of DI&C-ISG-06," states that the LAR should address the criteria associated with several areas of review that are described in further detail in Sections D.1 through D.12 of the document. In its application, PSEG stated that the LAR format and contents of Section 4.0, "Technical Evaluation," of Attachment 1 thereto are consistent with the guidance provided in Enclosure E and Section C.3 of DI&C-ISG-06.

Section D.9.4, "Technical Evaluation," of DI&C-ISG-06, Subsection D.9.4.2.14, "IEEE [Institute of Electrical and Electronics Engineers, Inc.] Std [Standard] 603," Clause 5.14, "Human Factors Considerations," states:

> Clause 5.14 requires that human factors be considered at the initial stages and throughout the development process to assure that the functions allocated in whole or in part to the users and maintainers can be successfully accomplished to meet the safety system design goals.

Enclosure

> The information provided should be sufficient to demonstrate that the guidance contained in NUREG-0700 ["Human-Systems Interface Design Review Guidelines"], NUREG-0711 ["Human Factors Engineering Program Review Model"] and [Standard Review Plan] SRP Section 18-A has been met.

Subsection D.9.4.2.14 states that such information should be provided during the initial application (Phase 1) of the submittal.

Section D.9.4, "Technical Evaluation," of DI&C-ISG-06, Subsection D.9.4.2.9, "IEEE Standard 603," Clause 5.9, "Control of Access," states, in part:

> The information needed by the NRC staff to reach a determination that the system is designed such that administrative controls of access to the equipment is adequate should be contained in the system, hardware and software specifications, architecture, and descriptions.

Subsection D.9.4.2.9 states that such information should be provided during the initial application (Phase 1) of the submittal.

NUREG-0800, Standard Review Plan, Appendix 18-A, "Crediting Manual Operator Actions in Diversity and Defense-in-Depth (D3) Analyses," Revision 0 (ADAMS Accession No. ML13115A156), states, in part:

> A diversity and defense-in-depth analysis should include the justification of any operator actions that are credited for response to an AOO/PA [Anticipated Operational Occurrence and Postulated Accident] concurrent with software CCF [Common Cause Failure] as described in BTP 7-19 [Branch Technical Position BTP 7-19, "Guidance for Evaluation of Diversity and Defense-In-Depth in Digital Computer-Based Instrumentation and Control."] Manual operator actions for these scenarios should be based upon, and ultimately included within, the Emergency Operating Procedures (EOPs) and executed from the main control room (MCR).

NUREG-0800, Appendix 18-A, further states:

> Credited manual operator actions and their associated interfaces (controls, displays, and alarms) should be specifically addressed in the vendor/licensee/applicant's HFE [Human Factors Engineering] Program. The vendor/licensee/applicant should commit, in the defense-in-depth submittal, to include the proposed defense-in-depth coping actions in a HFE Program consistent with that described in NUREG-0711, "Human Factors Engineering Program Review Model," and to provide the results of the HFE Program to the staff prior to implementation of the proposed action(s).

Supplemental Information Required

1. Section 4.1.2.5, "Human Factors Evaluation," of Attachment 1 to the LAR states, in part:

> Human Factors engineering is addressed as part of the PRNM design change package (DCP), including changes to the operator panel, as discussed below."

Section 4.1.2.5 further states:

> Detailed analysis of compliance with NUREG-0700 will be documented with the completion of the detailed design. The Phase 2 submittal of this PRNM LAR (provided approximately one year after this Phase 1 submittal) will provide a description of the NUREG-0700 compliance. A discussion of the OE [operating experience] assessed to support the PRNM upgrade will also be provided.

Section 3.19, "Information Readout," of the Safety Evaluation Report (SER) for NEDC-32410P-A (the proprietary Licensing Topical Report for NUMAC PRNM referenced in the LAR), states, in part:

> The licensees should ensure that additions or modifications to the plant operator's panel will receive human factors reviews per plant-specific procedures.

Section 5.0, "Plant-Specific Actions," of the SER for NEDC-32410P-A, states, in part:

> Licensees referencing NEDC-32410 for implementation of the PRNMS should provide the following information in their license amendment submittals ... (6) Confirm that any changes to the plant operator's panel have received human factors reviews per plant-specific procedures.

Provide supplemental information describing how the human factors have been considered in the initial stage and throughout the development process, as required by DI&C-ISG-06, for a Phase 1 submittal. Specifically, the information provided should demonstrate compliance with the guidance provided in NUREG-0700 and NUREG-0711, as applicable. All elements of the HFE program applicable to the proposed modification, as described in NUREG-0711, should be addressed, including, but not limited to, Operating Experience Review, Task Analysis, impact on procedures and operator training, etc.

2. Section 4.1.2, "Instability," of Appendix I to non-proprietary report NEDO-33864, Revision 0 (which is provided as Enclosure 2 to the LAR), states, in part:

> The diverse means for the safety trip function performed by the DSS-CD [Detect and Suppress Solution-Confirmation Density] algorithms at HCGS for the postulated common-cause failure (CCF) in PRNM is Manual Operator Action.

Section 4.1.2 further states:

> [I]f both the OPRM system is inoperable and the [Automatic Backup Stability Protection] ABSP function cannot be implemented or is inoperable, the licensed stability solution becomes the Manual Backup Stability Protection (BSP) Regions with the BSP Boundary, which is manually implemented through administrative actions. This is essentially the same backup approach utilized in Option III for the [Period Based Detection Algorithm] PBDA algorithm. In the Option III solution there is only one BSP Option, which is provided by the Manual BSP Regions and associated operator actions.

Provide supplemental information regarding the analysis that was performed in accordance with NUREG-0800, Appendix 18-A, demonstrating that (1) the time available to perform the required manual actions is greater than the time required for the operator(s) to perform the actions, and (2) the operator(s) can perform the actions correctly and reliably in the time available. The time available to perform the actions should be based on analysis of the plant response to the AOO/PA using realistic assumptions and the acceptance criteria of BTP 7-19. The time required for operator action should be based on an HFE analysis of operator response time.

3. Section 3.17, "Access to Setpoint Adjustments, Calibration, and Test Points," of the SER for NEDC-32410P-A, states, in part:

> Set point adjustments, calibrations, and testing processes are performed using the NUMAC operator interface panel. Access to panel functions is controlled via a keylock on the interface panel and different levels of passwords for access to software-based settings. The licensee should confirm that administrative controls are provided for manually bypassing APRM/OPRM channels, or protective functions, and for controlling access to the PRNMS panel and the APRM/OPRM channel bypass switch.

Section 5.0, "Plant-Specific Actions," of the SER for NEDC-32410P-A, states, in part:

> Licensees referencing NEDC-32410 for implementation of the PRNMS should provide the following information is their license amendment submittals... (5) Confirm that administrative controls are provided for manually bypassing APRM/OPRM channels or protective functions, and for controlling access to the panel and the APRM/OPRM channel bypass switch.

Section 4.4.2, "LPRM Detector I/V Curves," of Appendix F2 to NEDC-33684P, Revision 0, identifies two actions related to administrative controls required for I/V curve requirements.

Provide supplemental information describing the process that will ensure specific administrative controls are provided for manually bypassing APRM/OPRM channels, or protective functions, for controlling access to the PRNMS panel and the APRM/OPRM channel bypass switch, and for addressing the I/V curve requirements as described in Section 4.4.2 of Appendix F2 to

NEDC-33864P, Revision 0. Specifically describe if such administrative controls are accomplished by revising existing procedures or instituting new procedures, and identify the impact on operator training, if any.

In order to make the application complete, the NRC staff requests that PSEG supplement the application to address the information requested in the enclosure. A draft version of this request was discussed with your staff in a conference call on November 4, 2015. Please provide your response to this request by November 24, 2015 (i.e., within 13 business days of the date of the conference call). This will enable the NRC staff to begin its detailed technical review. If the response to the NRC staff's request is not received by the above date, the application will not be accepted for review pursuant to 10 CFR 2.101, and the NRC will cease its review activities associated with the application. If the application is subsequently accepted for review, you will be advised of any further information needed to support the staff's detailed technical review by separate correspondence.

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Sincerely,

/RA/

Thomas J. Wengert, Senior Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-354

Enclosure:
Supplemental Information Needed

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