



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

December 21, 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 – 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 (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 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, Rev. 4, "Clarify Application of Setpoint Methodology for LSSS [Limiting Safety System Setting] Functions" (ADAMS Accession No. ML092150990), to affected PRNM functions.

By letter dated November 17, 2015 (ADAMS Accession No. ML15313A180), the U.S. Nuclear Regulatory Commission (NRC) staff informed PSEG that additional information was 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. PSEG provided the requested information by letter dated November 19, 2015 (ADAMS Accession No. ML15323A268).

The purpose of this letter is to provide the results of the 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 performed its acceptance review of your application, as supplemented by the November 19, 2015, letter, in accordance with Revision 1 of the Office of Nuclear Reactor Regulation (NRR) Office Instruction LIC-109, "Acceptance Review Procedures" (ADAMS Accession No. ML091810088), Appendix B, "Guide for Performing Acceptance Reviews." The criteria of the Digital Instrumentation and Controls, Revision 1, of Interim Staff Guidance Digital I&C-ISG-06, "Licensing Process," dated January 19, 2011 (DI&C-ISG-06) (ADAMS Accession No. ML110140103), was used by the NRC staff to determine the technical and regulatory acceptance of the LAR during the acceptance review.

In its November 17, 2015, request for supplemental information, the NRC staff identified some information that was required to be included in the initial application (i.e., "Phase 1" of the review as described in DI&C-ISG-06) that was not included with the submittal. In its November 19, 2015, supplement, PSEG stated that this information would be made available for NRC staff review in the second quarter of 2016.

As noted in Section C.3 of ISG-06:

Initially, the NRC staff should review the application in accordance with the NRR Office Instruction, LIC-109, "Acceptance Review Procedures," ... to determine whether the application is sufficient for NRC staff review It is recognized that some sets of information may not be available upon initial application and the review process may be more efficiently administered by beginning prior to their availability. Therefore, a digital I&C upgrade application may be found to be sufficient for review provided a clear schedule for submission of omitted information is included. Any proposed changes to the schedule should be agreed upon by the NRC staff prior to a given due-date. Licensees should be made aware that the NRC staff intends to adhere to the schedule set forth and failure to submit information in accordance with the schedule may result in denial of the application pursuant to 10 CFR 2.108.

The NRC staff has reviewed your application and, acknowledging that some additional information will be submitted for staff review in the second quarter of 2016, concluded that it does provide technical information in sufficient detail to enable the NRC staff to complete its detailed technical review and 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.

Given the lesser scope and depth of the acceptance review as compared to the detailed technical review, there may be instances in which issues that impact the NRC staff's ability to complete the detailed technical review are identified despite completion of an adequate acceptance review. You will be advised of any further information needed to support the NRC staff's detailed technical review by separate correspondence.

Notwithstanding the above, the NRC staff identified some issues that may present challenges to the performance of a detailed technical evaluation of the proposed digital PRNM system upgrade LAR and will likely require additional clarification, as discussed below:

1. Compliance with NUREG-0700 and NUREG-0711

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, in part, that the information provided should be sufficient to demonstrate that the guidance contained in NUREG-0700 ["Human-Systems Interface Design Review Guidelines"] and NUREG-0711 ["Human Factors Engineering Program Review Model"] has been met. It further states that such information should be provided during the initial application (Phase 1) of the submittal.

PSEG's response dated November 19, 2015, states that assessment of compliance with NUREG-0700 is required as part of the PSEG Configuration Change process for the PRNM upgrade and that it will also address the review elements identified in NUREG-0711. The response further states that the assessment will be placed in the HCGS PRNM Electronic Reading Room portal in the second quarter of 2016.

Section C, "Digital I&C Review Process," of DI&C-ISG-06, Subsection C.2, "Pre-Application (Phase 0)," states, in part:

All proposed deviations from the document list and associated schedule described in Enclosure B should be discussed in the Phase 0 meeting(s). Any associated agreements should be documented in the Phase 0 meeting minutes. Delays by a licensee in meeting these commitments can result in an application being denied (see 10 CFR 2.108, "Denial of application for failure to supply information") or delay the evaluation completion date.

PSEG did not propose submitting the information described in Subsection D.9.4.2.14 of DI&C-ISG-06 during the Phase 0 meetings. Therefore, the NRC staff notes that this delay may challenge the staff's ability to complete the technical review of the digital PRNM upgrade LAR by the requested date.

2. Compliance with NUREG-0800, "Standard Review Plan," Appendix 18-A

Section D.9.4, "Technical Evaluation," of DI&C-ISG-06, Subsection D.9.4.2.14, "IEEE Std 603, Clause 5.14, Human Factors Considerations," states, in part, that the information provided should be sufficient to demonstrate that the guidance contained in Standard Review Plan, Appendix 18-A, has been met.

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, that a diversity and defense-in-depth analysis should include the justification of any operator actions that are credited for response to an Anticipated Operational Occurrence/Postulated Accident concurrent with software Common Cause Failure (CCF). It further states that credited manual operator actions and their associated interfaces (controls, displays, and alarms) should be specifically addressed in the vendor/licensee/applicant's Human Factors Engineering (HFE) Program. The vendor/licensee/applicant should commit, in the defense-in-depth

submittal, to include the proposed defense-in-depth coping actions in an HFE Program consistent with that described in NUREG-0711 and to provide the results of the HFE Program to the staff prior to implementation of the proposed action(s).

PSEG's response dated November 19, 2015, states that there are two scenarios that require manual operator action for diversity to address the postulated CCF in the PRNM system. It further states that because existing manual operator actions are relied on in the two scenarios, and no operator actions are being added, changed, or deleted, the analysis in accordance with NUREG-0800, Appendix 18-A, is not required.

The NRC staff disagrees with the response provided by PSEG. As stated in NUREG-0800, Appendix 18-A, to credit operator actions, an acceptable method would be to demonstrate that the manual actions in response to a BTP 7-19 software CCF are both feasible and reliable, given the time available, and that the ability of operators to perform credited actions reliably will be maintained for as long as the manual actions are necessary to satisfy the defense-in-depth analysis.

To demonstrate that the manual actions are both feasible and reliable, and the ability to perform the actions reliably within the time available is maintained, PSEG should follow a process of analysis, validation, and long-term monitoring consistent with NUREG-0800, Appendix 18-A. The analysis should demonstrate 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.

Changes in plant design, including those that do not add, change, or delete the credited manual operator actions, may affect the ability of operators to correctly and reliably perform manual actions due to performance shaping factors (e.g., workload, time pressure) or other causes. PSEG should provide sufficient information to demonstrate that the conclusions reached in the previously performed analysis regarding the feasibility and reliability of credited manual operator actions will remain valid in the post-modification environment (i.e., that the time available to perform the required manual actions and the time required to perform such actions will not be adversely affected by the proposed modification).

The NRC staff may request that PSEG submit additional information to support the staff's technical review by separate correspondence.

Conclusion

As noted, the issues identified above may challenge the NRC staff's ability to complete its technical review of the digital PRNM system upgrade LAR. However, based on PSEG providing (1) high quality and timely supporting documentation as described in DI&C-ISG-06, including submission of the omitted information, (2) acceptable resolution of the issues noted above, and (3) a timely response to licensee actions requested by the NRC staff during the LAR review, the NRC staff expects that the amendments could be issued by the end of the fourth quarter of 2017, as requested in PSEG's September 21, 2015, application. However, as stated above, the delay in submitting the information noted in this letter, may challenge the staff's ability to complete the technical review by the requested date.

R. Braun

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If you have any questions, please contact me at (301) 415-1603 or Carleen.Parker@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Carleen J. Parker". The signature is written in a cursive style with a large, sweeping "P" at the end.

Carleen J. Parker, Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-354

cc: Distribution via Listserv

If you have any questions, please contact me at (301) 415-1603 or Carleen.Parker@nrc.gov.

Sincerely,

/RA/

Carleen J. Parker, Project Manager
Plant Licensing Branch I-2
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