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PSEG
Nuclear LLC

10 CFR 50.54(f)

LR-N13-0052
March 12, 2013

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

Salem Nuclear Generating Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-70 and DPR-75
NRC Docket Nos. 50-272 and 50-311

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

Subject: Response to Request for Information Regarding Flooding Aspects of Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident – Hazard Reevaluation Report Extension Request

References:

(1) U.S. Nuclear Regulatory Commission (NRC) letter, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012, ADAMS Accession No. ML12053A340

(2) NRC letter, "Prioritization of Response Due Dates for Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Flooding Hazard Reevaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated May 11, 2012, ADAMS Accession No. ML12097A509

(3) NRC Request for Additional Information No. 67 Regarding the PSEG Early Site Permit Application, Docket No. 52-043, SRP Section: 02.04.05 – Probable Maximum Surge and Seiche Flooding, (eRAI 6615), dated October 29, 2012, ADAMS Accession No. ML12303A012

(4) PSEG Early Site Permit Application, Docket No. 52-043, Site Safety Analysis Report Revision 1 - Chapter 2, "Site Characteristics and Site Parameters," dated June 11, 2012, ADAMS Accession No. ML12170A043

(5) NRC Interim Staff Guidance JLD-ISG-2012-06, "Interim Staff Guidance for Performing a Tsunami, Surge, or Seiche Hazard Assessment," Revision 0, dated January 4, 2013

(6) NRC letter, "Supplemental Information Related to Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Flooding Hazard Reevaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 1, 2013, ADAMS Accession No. ML13044A561

(7) PSEG letter LR-N12-0170, "PSEG Nuclear LLC's Response to Request for Information Pursuant to 10 CFR 50.54(f) Regarding the Flooding Aspects of Recommendations 2.1 and 2.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated June 7, 2012, ADAMS Accession No. ML12160A292

(8) PSEG letter ND-2012-0076, "PSEG Early Site Permit Application, Docket No. 52-043, Response to Request for Additional Information, RAI No. 67, Probable Maximum Surge and Seiche Flooding," dated November 27, 2012, ADAMS Accession No. ML12334A030

(9) NRC letter to Nuclear Energy Institute (NEI), "Trigger Conditions for Performing an Integrated Assessment and Due Date for Response," dated December 3, 2012, ADAMS Accession No. ML12326A912

(10) NRC report, "Recommendations for Enhancing Reactor Safety in the 21st Century – The Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated July 12, 2011, ADAMS Accession No. ML112510271

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued a request for information (Reference 1) to PSEG Nuclear LLC (PSEG), associated with Near-Term Task Force (NTTF) Recommendation 2.1 for flooding. Reference 1, Enclosure 2, "Recommendation 2.1: Flooding," requests, in part, that PSEG submit a Flooding Hazard Reevaluation Report for the Salem and Hope Creek Generating Stations. On May 11, 2012, the NRC issued a prioritization plan (Reference 2) that established an external flooding hazard reevaluation schedule for each licensee. Provided herein is PSEG's extension request for the Salem and Hope Creek Generating Stations' Flooding Hazard Reevaluation Report submittals.

The Reference 2 prioritization plan placed each operating nuclear plant into Category 1, 2, or 3, corresponding to a Flooding Hazard Reevaluation Report submittal due date of March 12, 2013, March 12, 2014, or March 12, 2015, respectively. Salem Nuclear Generating Station, Units 1 and 2, and Hope Creek Generating Station were identified as Category 1 plants, which is consistent with the categorization of plants that are co-located with an Early Site Permit (ESP) site or a Combined License (COL) site. Flooding hazard reevaluations at operating reactor sites co-located with ESP or COL sites were expected to involve relatively little effort beyond that which was completed in support of the ESP or COL application.

On October 29, 2012, subsequent to Salem and Hope Creek Generating Stations' placement into Category 1, the NRC issued a request for additional information (RAI) (Reference 3) pertaining to the storm surge analyses described in the PSEG Early Site Permit Application (ESPA) Site Safety Analysis Report (SSAR), Chapter 2 (Reference 4). Reference 3 includes an NRC staff request for PSEG to provide an analysis of hurricane events using a current practice approach such as a two-dimensional storm surge model. The ESPA storm surge analysis used the Bodine model to determine the surge at the mouth of the Delaware Bay, which was input to a one-dimensional Hydraulic Engineering Center River Analysis System (HEC-RAS) model to determine storm surge at the site.

On January 4, 2013, the NRC issued interim staff guidance (ISG) (Reference 5) for storm surge analyses in support of the Fukushima flooding hazard reevaluations. The Reference 5 ISG states that the use of bathystrophic models (including Bodine, 1969, et. al.) to develop storm surge is no longer consistent with the current state of knowledge. The ESPA storm surge analysis described in Section 2.4.5 of Reference 4 used the Bodine model and one-dimensional HEC-RAS model, which is not consistent with current NRC expectations as reflected in both the PSEG ESPA RAI (Reference 3) and the ISG for storm surge analysis (Reference 5). Therefore, the ESPA storm surge analysis cannot be used for the purposes of developing the Salem and Hope Creek Generating Stations' flooding hazard reevaluations. A new analysis must be performed accordingly, and PSEG requests a schedule extension commensurate with the level of effort required to reevaluate the flooding hazard in a manner consistent with current NRC criteria.

On February 11, 2013, the NRC staff held a public meeting with the Nuclear Energy Institute (NEI) and other industry representatives to discuss flooding hazard reevaluations. Consistent with discussions at the February 11, 2013 meeting, the NRC issued a letter dated March 1, 2013 (Reference 6), which includes its position regarding Flooding Hazard Reevaluation Report schedule extension requests. Specifically, Reference 6 states that a licensee's extension request should include (1) the reason for the delay; (2) a proposed schedule for the submittal of a complete Hazard Reevaluation Report; and (3) the basis for the acceptability of the revised schedule.

Reason for the Delay

Salem and Hope Creek Generating Stations' Flooding Hazard Reevaluation Report original due date of March 12, 2013 is compatible with the use of an existing ESPA storm surge analysis to complete the station-specific flooding hazard reevaluation. Based on the expectation that the ESPA storm surge analysis would be acceptable for use in developing Salem and Hope Creek flooding hazard reevaluations, PSEG affirmed, in Reference 7, its intention to meet the requested Category 1 schedule. However, PSEG's ESPA analysis (described in Reference 4) used the Bodine storm surge model and one-dimensional HEC-RAS model, and is therefore not consistent with current NRC criteria (Reference 5) established in January of 2013. Completion of the Flooding Hazard Reevaluation Report therefore requires a significant reanalysis effort. Additional details are provided below.

After PSEG affirmed the Flooding Hazard Reevaluation Report due date of March 12, 2013, the NRC issued the Reference 3 PSEG ESPA RAI, which requests that PSEG evaluate hurricane events "using a conservative, current practice approach such as those predicted by a two-dimensional storm surge model (e.g., ADCIRC, FVCOM, SLOSH, other) with input from appropriate PMH {Probable Maximum Hurricane} scenarios and with resolution that captures the nuances of the bathymetry and topography near the project site." PSEG responded to the ESP RAI via Reference 8, with a plan to provide the results of the revised storm surge analysis using a more current, two-dimensional model.

The January 2013 NRC ISG for storm surge hazards assessment (Reference 5) states, in part:

> "The determination of the storm surge from bathystrophic models (Bretschneider, 1966; Bodine, 1969; Pararas-Carayannis, 1975) used in Regulatory Guide 1.59, which is based on earlier wind field calculations, is not consistent with the current state of knowledge."

PSEG's ESPA used the Bodine storm surge and one-dimensional HEC-RAS models, and is therefore inconsistent with current NRC guidance for flooding hazard reevaluation. PSEG will complete a new flooding hazard analysis to respond to RAI 67 and use the guidance of the Reference 5 ISG for the Fukushima flooding hazards reevaluation. PSEG is requesting an extension to the due date for the Flooding Hazard Reevaluation Report in order to complete an acceptable flooding analysis for Salem and Hope Creek.

For the PSEG site, the storm hazard assessment is a complete re-analysis and involves the use of the Joint Probability Method (JPM) to develop hurricane storm parameters, and two-dimensional modeling software (ADCIRC) to analyze the site specific storm surge. This reanalysis requires the use of specific technical expertise. The two-dimensional model requires significant computing resources to perform a number of modeling runs. Prior to performing modeling runs, the model requires the collation of updated topographic data and the validation of the model against known storm flood levels in the Delaware Bay. In addition, highly detailed PSEG site topography is required to be integrated with the regional data into the final ADCIRC grid. Wave run-up will need to be determined for each safety related structure and will involve calculations for each individual structure. Finally, completion of the Flooding Hazard Reevaluation Report requires a comparison of the new beyond-design basis analysis to the current design basis, and identification of any additional actions based on integrated assessment trigger conditions in Reference 9.

Proposed Schedule for the Submittal of a Complete Hazard Reevaluation Report

PSEG proposes a revised submittal date for the Salem and Hope Creek Generating Stations' Flooding Hazard Reevaluation Report of March 12, 2014.

Basis for the Acceptability of the Revised Schedule

The original basis for establishing the Salem and Hope Creek Generating Stations as Category 1 plants for external flooding hazard reevaluation included the expectation that the ESP storm surge analysis would be an acceptable input to the reevaluations, and that relatively little effort beyond the completed ESP analysis would be required. However, PSEG cannot use the current ESP storm surge analysis, and the original basis for placing Salem and Hope Creek in Category 1 is no longer valid. The Reference 2 prioritization letter includes Category 3 sites (i.e., sites with a Flooding Hazard Evaluation Report due date of March 12, 2015) whose hazard reevaluations will likely involve complex analyses of potential storm surge flooding. The Salem and Hope Creek Generating Stations flooding hazard reevaluations require a complete storm surge reanalysis, and are therefore similar to some Category 3 sites in terms of the level of effort and complexity of the actions required. PSEG's proposed schedule is significantly earlier than the Category 3 schedule of March 12, 2015, and is compatible with the overarching objective of completing the reevaluations in a structured and timely manner.

The requested schedule extension is supported by existing flood mitigation capabilities. The most severe design basis flooding hazard for the Salem and Hope Creek Generating Stations is the result of potential hurricane storm surge. Storm surge events are preceded by significant advance warning, e.g., a Hurricane Watch would alert an area that a hurricane may make landfall in the vicinity of the area within 48 hours. PSEG currently utilizes guidance for severe weather preparations and implements operating procedures in the event of approaching severe storm events. Preparatory measures include augmenting onsite staffing levels; checking flood

protection features such as watertight doors and sump pumps; checking inventories of diesel fuel and water storage tanks; implementing work control measures to enhance availability of equipment important to safety; use of sandbags to augment design basis flood protection features; and other measures under the direction of a severe weather coordinator. Operating procedures include measures to close watertight doors in anticipation of rising Delaware River water levels, suspend maintenance and testing activities that could challenge availability of equipment important to safety and, in the event that Delaware River water levels actually approach design basis levels, initiate unit shutdown. PSEG's severe weather guidelines and procedures have been successfully implemented during actual storm events in the vicinity of the PSEG site, including Hurricane Sandy in October 2012. Delaware River water level has never exceeded Salem and Hope Creek Generating Stations' site grade elevation.

As stated in the NRC's Near-Term Task Force Review of the Insights from the Fukushima Dai-ichi Accident (Reference 10):

> "…in light of the low likelihood of an event beyond the design basis of a U.S. nuclear power plant and the current mitigation capabilities at those facilities, the Task Force concludes that continued operation and continued licensing activities do not pose an imminent risk to the public health and safety and are not inimical to the common defense and security."

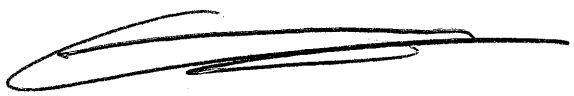
The requested extension date is well within the current response deadline for Category 3 plants, flood mitigation capabilities are currently in place, and the likelihood of a beyond-design basis flooding event is low. This is the basis for the acceptability of the revised schedule.

Attachment 1 contains the regulatory commitments associated with this submittal. Other statements in this submittal are for information and are not regulatory commitments. If you have any questions or require additional information, please do not hesitate to contact Mrs. Emily Bauer at 856-339-1023.

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

Executed on 3-17-2013
(Date)

Sincerely,



Christine T. Neely
Director – Regulatory Affairs

Attachment 1 – List of Commitments

cc: Mr. E. Leeds, Director of Office of Nuclear Reactor Regulation
Mr. W. Dean, Administrator, Region I, NRC
Mr. J. Hughey, Project Manager, NRC
NRC Senior Resident Inspector, Salem
NRC Senior Resident Inspector, Hope Creek
Mr. P. Mulligan, Manager IV, NJBNE
Hope Creek Commitment Tracking Coordinator
Salem Commitment Tracking Coordinator
PSEG Commitment Coordinator – Corporate

List of Commitments

The following table identifies PSEG regulatory commitments associated with this transmittal. Any other statements contained herein are for information and are not regulatory commitments.

Commitment	Committed Date or Milestone	Commitment Type	
		One-Time Action (Yes/No)	Programmatic (Yes/No)
PSEG will submit a Flooding Hazard Reevaluation Report for the Hope Creek Generating Station.	March 12, 2014	Yes	No
PSEG will submit a Flooding Hazard Reevaluation Report for the Salem Nuclear Generating Station, Units 1 and 2.	March 12, 2014	Yes	No