

January 28, 2014

MEMORANDUM TO: John Segala, Chief
Licensing Branch 1
Division of New Reactor Licensing
Office of New Reactors

FROM: Prosanta Chowdhury, Project Manager */RA/*
Licensing Branch 1
Division of New Reactor Licensing
Office of New Reactors

SUBJECT: FEBRUARY 4 - 6, 2014, AUDIT OF PSEG POWER, LLC AND PSEG
NUCLEAR, LLC EARLY SITE PERMIT APPLICATION HYDROLOGY
ANALYSES

By letter dated May 25, 2010, PSEG Power, LLC and PSEG Nuclear, LLC (PSEG) submitted the PSEG Site Early Site Permit (PSEG Site ESP) application to the U. S. Nuclear Regulatory Commission (NRC). On October 29, 2012, the NRC staff issued to PSEG request for additional information (RAI) No. 67 related to hydrology storm surge. By letter dated November 27, 2013, PSEG submitted a response to this RAI. The NRC staff has begun reviewing the RAI response and has identified a need to audit the methodology, analysis, calculations, and modeling results in support of the Site Safety Analysis Report (SSAR), Section 2.4, "Hydrology," of the PSEG Site ESP application. The audit will take place at the PSEG's Energy and Environmental Resource Center in Salem, New Jersey, from February 4 - 6, 2014. A copy of the audit plan is enclosed.

Docket No.: 52-043

Enclosure:
As stated

CONTACT: Prosanta Chowdhury, NRO/DNRL
301-415-1647

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DATE	01/24/2014	01/24/2014	01/27/2014	01/28/2014

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PSEG SITE EARLY SITE PERMIT APPLICATION HYDROLOGY AUDIT PLAN

A. Background

PSEG Power, LLC and PSEG Nuclear, LLC (PSEG) submitted storm surge modeling information in Site Safety Analysis Report (SSAR), Section 2.4, "Hydrology," of the PSEG Site Early Site Permit (ESP) application. In the course of the review of this information, the staff issued a request for additional information (RAI) related to hydrology storm surge. On November 27, 2013, PSEG submitted a response to this RAI. The NRC staff reviewed the information in the RAI response in conjunction with SSAR Section 2.4, and identified information needs that would promote a better understanding of the detailed analyses and bases underlying the formal application.

The purpose of this audit is for the NRC staff to review the storm surge models, supporting modeling documentations, and calculation packages, and discuss these issues with the applicant's subject matter experts (SMEs), staff and contractors. This audit will allow the NRC staff to better understand the storm surge modeling results in order to make accurate safety conclusions concerning site characteristics and assess the consequences of storm surge flooding. It will also assist the NRC staff in identifying any additional information that the staff may need during its review of PSEG Site ESP application.

B. Regulatory Audit Bases

This regulatory audit is based on the following:

- NUREG 0800, "Standard Review Plan," Section 2.4, "Hydrology"
- RS-002, "Guidance for Processing Applications for Early Site Permits"
- Regulatory Guide (RG) 1.206, "Combined License Applications for Nuclear Power Plants"

C. Regulatory Audit Scope or Methodology

- The area of focus for the audit is the PSEG Site ESP application and supporting documentation.

D. Information and Other Material Necessary for the Regulatory Audit

- ESP Application, Rev. 2, Section 2.4
- Information Needs (See ATTACHMENT)

E. Audit Team

The following are the audit team members:

Kenneth Erwin, NRC Audit Team Lead
Henry Jones, NRC Audit Team Member
Michelle Bensi, NRC Audit Team Member
Michael Lee, NRC Audit Team Member
Joseph Giacinto, NRC Audit Team Member
Kevin Quinlan, NRC Audit Team Member

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Chris Bender, Taylor Engineering, Inc., NRC Audit Team Member
Prosanta Chowdhury, NRC Project Manager
Michael Eudy, NRC Project Manager
Michael Takacs, NRC Project Manager

F. Logistics

Date: February 4 and 5, 2014
8:30 a.m. – Audit Opens
4:30 p.m. – Audit Adjourns for the Day

Date: February 6, 2014
8:30 a.m. – Audit Resumes
11:30 a.m. – Audit Concludes
12:30 p.m. – Audit Exit – Public Meeting Begins (Conference call format)
4:00 p.m. – Audit Exit – Public Meeting Adjourns

Location: PSEG Nuclear Development
Energy and Environmental Resource Center
244 Chestnut St.
Salem, New Jersey

G. Deliverables

The audit team plans to issue a regulatory audit summary within 90 days after completing the audit.

**PSEG Site - Hydrology (Chapter 2.4) Review
Site Audit Information Needs**

Serial No.	SSAR Section	Information Need
1	2.4.5	<p>Have available the following <u>SWAN+ADCIRC Mesh documentation</u> and knowledgeable SME to discuss:</p> <ul style="list-style-type: none"> ○ Fort.13, Fort.14, Fort.15, Fort.26 for mesh applied in PSEG analysis runs (FEMA Region 3 Coastal study provided base model) ○ Documentation that describes changes to FEMA Region 3 mesh and nodal attributes to improve representation around the PSEG facility.
2	2.4.5	<p>Have available the following <u>SWAN+ADCIRC Validation documentation</u> and knowledgeable SME to discuss:</p> <ul style="list-style-type: none"> ○ Wind and pressure field files for validation storms (Isabel and Nor'easter Ida) ○ Documentation and calculation packages that shows the model validation results (tables and figures of measured versus modeled results for locations with water level, current, and/or wave data).
3	2.4.5	<p>Have available the following <u>SWAN+ADCIRC JPM-OS Storm Evaluation documentation</u> and knowledgeable SME to discuss:</p> <ul style="list-style-type: none"> ○ Documentation and calculation packages that show the JPM-OS development and resulting JPM-OS storm suite. Specific information needed: <ul style="list-style-type: none"> ▪ methods to determine JPM-OS storm parameters (track angles, intensities, radius to maximum winds, intensity, etc.) ▪ method to produce JPM-OS winds ▪ method applied to simulate JPM-OS storms in SWAN+ADCIRC ▪ method to analyze SWAN+ADCIRC storm surge data to produce various return period water levels ▪ method to include uncertainty (aleatory and epistemic) ○ Wind and pressure field files for SWAN+ADCIRC model runs that produced the highest five surge levels at the PSEG facility ○ Documentation that shows the model results (tables and figures of modeled water level, current, and/or wave data for locations analyzed near the PSEG facility). ○ Documentation that discusses any changes to modeling approach to handle instances of SWAN+ADCIRC model instability found during simulation of JPM-OS storms.

Serial No.	SSAR Section	Information Need
4	2.4.5	<p>Have available the following <u>wave runup evaluation documentation</u> and knowledgeable SME to discuss:</p> <ul style="list-style-type: none"> ○ Documentation and calculation packages that detail the approach, analysis, and results of wave runup calculations at the PSEG facility. ○ Documentation of pertinent facility structure slopes, roughness, and heights as applied in the wave run-up calculations ○ Documentation of how SWAN wave heights and periods were applied within wave run-up calculations <ul style="list-style-type: none"> ▪ Significant wave height versus maximum wave height, or other wave height level ▪ Peak period, mean period, or other wave period level
5	2.4.5	<p>Have available the following <u>total water level calculation documentation</u> and knowledgeable SME to discuss:</p> <ul style="list-style-type: none"> ○ Documentation and calculation packages that detail the approach, analysis, and results of total water level calculations at the PSEG facility (SWAN+ADCIRC plus wave run-up).
6	2.4.5	<p>Have available the following <u>probabilistic characterization of storm surge documentation</u> and knowledgeable SME to discuss:</p> <ul style="list-style-type: none"> ○ Documentation and calculation packages that detail the approach, analysis, and results of probabilistic water level calculations. Specific information needed: <ul style="list-style-type: none"> ▪ determination of water levels input into probabilistic model ▪ how tides, river discharge, Holland B, forward velocity handled within method ▪ treatment of uncertainty within the calculations
7	2.4.5	<p>Have available appropriate documents and references as well as an SME who is knowledgeable about the <u>probabilistic characterization of storm surge</u> to discuss the following:</p> <ul style="list-style-type: none"> ○ Interpretation of the annual exceedance probability (AEP) of 10^{-6} in light of the use of deterministic models and any associated potential bias inherent in those models.

Serial No.	SSAR Section	Information Need
8	2.4.5	<p>Have available relevant documentation and an SME who is knowledgeable about the <u>probabilistic characterization of storm surge</u> to discuss the following:</p> <ul style="list-style-type: none"> ○ Probability distributions (distribution models and parameters) associated with storm parameters and error terms in the JPM-OS integral. ○ Basis for distribution models and parameters selected, including any analyses performed using historical data or expert judgment, or based on existing studies (including copies of reports and draft reports taken as final). ○ Approach to account for epistemic uncertainty in the characterization of selected distributions and their parameters (including potential alternate interpretations of available data). ○ The effect of limited historical record on the characterization of distribution models and parameters. ○ Approach account for epistemic uncertainty in model selection and characterization of inputs (e.g., bathymetry, topography). ○ Treatment and incorporation of aleatory uncertainty. ○ The distribution parameters for the composite error term.
9	2.4.5	<p>Have available relevant documentation and an SME who is knowledgeable about the <u>probabilistic characterization of storm surge</u> to discuss the following:</p> <ul style="list-style-type: none"> ○ Sensitivity studies performed related to exclusion of parameters from the JPM-OS integration. ○ Treatment of the Holland B parameter through modification of the standard deviation of the error term.
10	2.4.5	<p>Have available (1) computer codes, relevant input/output files (including subroutines), and calculation packages used to perform or validate JPM-OS integration and associated calculations and (2) an SME who is knowledgeable about the code, files, and calculations.</p>

Serial No.	SSAR Section	Information Need
11	2.4.5	<p>Have available relevant documentation and an SME who is knowledgeable about the <u>probabilistic characterization of storm surge</u> to discuss the following:</p> <ul style="list-style-type: none"> ○ The basis and implication of the selected discretization scheme for the JPM-OS integration.
12	2.4.5	<p>Have available a table of the storm parameters and resulting surge levels used to develop the surge response surface.</p>
13	2.4.5	<p>Have available the following <u>Design Basis Level Calculation documentation</u> and knowledgeable SME to discuss:</p> <ul style="list-style-type: none"> ○ Data applied to determine the potential Sea Level Rise (SLR) at the PSEG facility. ○ Rationale for selecting 10^{-6} as the design basis level floods.

ESP - PSEG Mailing List

(Revised 01/23/2014)

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