

UNITED STATES OF AMERICA
 NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
	)	Docket No. 52-043-ESP
PSEG POWER, LLC AND PSEG)	
NUCLEAR, LLC	)	ASLBP No. 15-943-01-ESP-BC01
)	
(Early Site Permit Application)	)	March 11, 2016

NRC STAFF TESTIMONY RELATED TO JANUARY 27, 2016 ORDER
TOPIC 5: CONSIDERATION OF FUKUSHIMA EVENTS AND RECOMMENDATIONS

Q1: Please state your name, occupation, employer, and professional qualifications.

A1: (PC) My name is Prosanta Chowdhury. I am a Project Manager in Licensing Branch 1, Division of New Reactor Licensing, Office of New Reactors (NRO), U.S. Nuclear Regulatory Commission (NRC). A statement of my professional qualifications is included in Exhibit (Ex.) NRC002.

(JFG) My name is Joseph F. Giacinto, I am a Hydrologist in the Hydrology and Meteorology Branch, Division of Site Safety and Environmental Analysis (DSEA), NRO, NRC. A statement of my professional qualifications is included in Ex. NRC002.

(HJ) My name is Henry Jones. I am a Hydrologist in the Hydrology and Meteorology Branch, DSEA, NRO, NRC. A statement of my professional qualifications is included in Ex. NRC002.

(DS) My name is Dogan Seber. I am a senior Geophysicist in the Geosciences and Geotechnical Engineering Branch 1, DSEA, NRO, NRC. A statement of my professional qualification is included in Ex. NRC002.

(SDG) My name is Stephanie Devlin-Gill. I am a Project Scientist in the DSEA, NRO, NRC. A statement of my professional qualification is included in Ex. NRC002.

(DEP) My name is Dr. Donald Palmrose. I am a Senior Staff member in the Radiation Protection and Accident Consequences Branch, DSEA, NRO, NRC. A statement of my professional qualifications is included in Ex. NRC002.

(BJM) My name is Bruce J. Musico. I am a Senior Emergency Preparedness Specialist in the New Reactor Licensing Branch, Division of Preparedness and Response, Office of Nuclear Security and Incident Response, NRC. A statement of my professional qualifications is included in Ex. NRC002.

Q2: Please describe your responsibilities with regard to the Staff’s review of the PSEG Site Early Site Permit (ESP) application.

A2: (PC) As the NRC lead Project Manager, I was responsible for coordinating all aspects of the Staff’s safety review of the PSEG Site ESP application. I was also responsible for coordinating the Staff’s presentation of safety evaluations to the Advisory Committee on Reactor Safeguards (ACRS), and publication of the Final Safety Evaluation Report (FSER) (Ex. NRC003).

(JFG) As the hydrology team lead on the safety review of the PSEG Site ESP application, I was responsible for coordinating the review of all subsections of Site Safety Analysis Report (SSAR) Section 2.4, "Hydrologic Engineering," (Ex. PSEG004B) developing the Staff's FSER for Section 2.4, and coordinating, developing, and presenting to the ACRS all subsections of the FSER Section 2.4 (Ex. NRC003) with the exception of subsections 2.4.5, "Probable Maximum Surge and Seiche Flooding," and 2.4.6 "Probable Maximum Tsunami Hazards." In addition, I was responsible for coordinating finalization of the entire Section 2.4 for ACRS meeting as well as subsequent inclusion in the Staff's FSER (Ex. NRC003).

(HJ) As the hydrology team lead oceanographer, I was responsible for reviewing SSAR subsections 2.4.5 and 2.4.6 (Ex. PSEG004B), developing the Staff's FSER for those subsections (Ex. NRC003), and presenting those two sections to the ACRS.

(DS) As one of the seismology reviewers, I was responsible for the review of SSAR Section 2.5.2, "Vibratory Ground Motion" (Ex. PSEG004B).

(SDG) As one of the seismology reviewers, I was responsible for the review of SSAR Section 2.5.2 (Ex. PSEG004B).

(DEP) I provided contractor technical oversight and the Staff's technical review for radiological health impacts under the PSEG Site ESP environmental review with specific areas of radiological effluent releases, construction worker dose, postulated severe accident risks, and health impacts associated with the transportation of radioactive material (i.e., unirradiated fuel, spent fuel, and radioactive waste).

(BJM) I served as NRC's technical reviewer of the complete and integrated emergency plan including associated inspections, tests, analyses, and acceptance criteria (ITAAC), in support of the PSEG Site suitability review, and prepared the Staff's FSER for Section 13.3, "Emergency Planning" (Ex. NRC003).

Q3: What is the purpose of your testimony?

A3: (PC, DS, SDG, JFG, HJ, DEP, BJM) The purpose of our testimony is to explain whether (and if so, to what extent) the Staff's review of the PSEG Site ESP application differs from the previous ESP application reviews in light of the applicable aspects of the Fukushima Near-Term Task Force (NTTF) Recommendations issued by the NRC following the March 11, 2011, Great Tohoku earthquake and tsunami in Japan.

Q4: What is the basis and scope of the NRC's Fukushima NTTF Recommendations?

A4: (PC) In response to the events at Fukushima resulting from the March 11, 2011, Great Tohoku earthquake and tsunami in Japan, the NRC established an NTTF to conduct a systematic and methodical review of NRC processes and regulations to determine whether additional improvements to the NRC regulatory system and recommendations to the Commission for policy directions should be made. In July 2011, via SECY-11-0093, "Near Term Report and Recommendations for Agency Actions Following the Events in Japan," (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11186A950), the NTTF identified 12 recommendations. In SECY 11-0124, "Recommended Actions to Be Taken without Delay from the NTTF Report" dated September 9, 2011, (ADAMS Accession No. ML11245A144), the Staff concluded that specific actions to address a subset of the NTTF recommendations would provide the greatest potential for improving safety in the near term. In SECY-11-0137, "Prioritization of Recommended Actions to Be Taken in Response to Fukushima Lessons Learned," dated October 3, 2011, (ADAMS Accession No. ML11269A204), the Staff identified two actions in addition to those discussed in SECY-11-0124 that had the greatest

potential for improving safety in the near term. In SECY-12-0025, "Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami," dated February 17, 2012, (ADAMS Accession No. ML12039A103), the Staff provided the Commission with proposed orders and requests for information to be issued to all power reactor licensees and holders of construction permits. In the staff requirements memorandum to SECY-12-0025, dated March 9, 2012, the Commission approved issuing the proposed orders with some modifications. Although this order was only applicable to operating nuclear power plants, and not applicable to ongoing license and permit application reviews, the Staff, as part of its review, carefully considered these orders, identified applicable conditions, and if necessary, requested additional information from combined license (COL) and ESP applicants to address such issues under the current regulatory framework.

Q5: Which of the Fukushima NTTF Recommendations were considered as possibly applicable to an ESP?

A5: (PC) The following Tier 1 recommendations from SECY-11-0137, as modified in SECY-12-0025, were considered in determining which would be applicable to the PSEG Site ESP application review:

- Recommendation 2.1: Seismic and Flood Hazard Reevaluations
- Recommendation 2.3: Seismic and Flood Walkdowns
- Recommendation 4.1: Station Blackout Regulatory Actions
- Recommendation 4.2: Equipment Covered under 10 CFR 50.54(hh)(2)
- Recommendation 5.1: Reliable Hardened Vents for Mark I and Mark II Containments
- Recommendation 7.1: Spent Fuel Pool Instrumentation
- Recommendation 8: Strengthening and Integration of Emergency Operating Procedures, Severe Accidents Management Guidelines, and Extensive Damage Mitigation Guidelines
- Recommendation 9.3: Emergency Preparedness Regulatory Actions (staffing and communications)

Following the review of the above list, the Staff determined that only Recommendations 2.1 and 9.3 were applicable to the PSEG Site ESP application review.

Q6: What guidance did the Staff follow in evaluating the Applicant's information in the context of the applicable Fukushima NTTF Recommendations?

A6: (PC, DS, SDG, JFG, HJ, BJM) The Staff primarily used the agency's Standard Review Plan (SRP) (NUREG-0800).

(DS, SDG) Additionally, for verification that the Applicant considered the latest information in the evaluation of seismic hazards (FSER Section 2.5.2) (Ex. NRC003), the Staff used the existing guidance in Regulatory Guide (RG) 1.208, "A Performance-Based Approach to Define the Site Specific Earthquake Ground Motion" and NUREG-2115, "Central and Eastern United States Seismic Source Characterization for Nuclear Facilities" (CEUS-SSC).

(JFG, HJ) For verification of assurance that natural flooding phenomena that could potentially affect the site have been appropriately identified and characterized (FSER Sections 2.4.5 and 2.4.6) (Ex. NRC003), the Staff used the existing RG 1.59, "Design Basis Floods for Nuclear Power Plants," as supplemented by best current practices.

(BJM) With respect to the staffing and communications aspects of NTTF Recommendation 9.3, the Staff used the SRP (NUREG 0800) and NUREG-0654/FEMA-REP-1, Revision 1, "Criteria for

Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants,” Section B, “Onsite Emergency Organization,” Section F, “Emergency Communications,” and NUREG–0696, “Functional Criteria for Emergency Response Facilities.”

(DEP) With respect to the environmental review of postulated accidents, the Staff used Section 7.2, Severe Accidents, of the Standard Review Plan for Environmental Reviews for Nuclear Power Plants (NUREG-1555).

Q7: What was the Staff’s safety finding with regard to the Applicant’s information in addressing the applicable Fukushima NTTF Recommendations?

A7: (PC) As stated in FSER Chapter 20, “Requirements Resulting From Fukushima Near-Term Task Force Recommendations” (see pages 20-2 and 20-3) (Ex. NRC003), the Staff considered Fukushima NTTF Recommendations 2.1, 2.3, 4.1, 4.2, 5.1, 7.1, 8, and 9.3 to determine those that would be applicable to the PSEG Site ESP application review.

As also stated in FSER Chapter 20 (Ex. NRC003), the NTTF concluded that Recommendations 2.3, 4.1, 4.2, 5.1, 7.1, and 8 are applicable to design certification applications and/or COL applications. The Staff determined that within the scope of a site suitability determination, none of these recommendations would be applicable to the PSEG Site ESP application review.

(DS, SDG) The Staff determined that the Applicant’s use of the most recent seismic source model, i.e., CEUS-SSC, for its site specific seismic hazard calculations fully and adequately addressed the reevaluation of seismic hazards aspect of NTTF Recommendation 2.1. There are no additional requirements left to be addressed in Recommendation 2.1 for seismic reevaluations applicable to the PSEG Site ESP application review.

(JFG, HJ) The Staff determined that the Applicant’s use of RG 1.59 fully and adequately addressed the flooding hazard reevaluation aspect of Recommendation 2.1. There are no additional requirements left to be addressed in Recommendation 2.1 for flooding reevaluations applicable to the PSEG Site ESP application review.

(BJM) Because the Applicant elected to submit an ESP application including complete and integrated emergency plans (Ex. PSEG004AC), the Staff determined that NTTF Recommendation 9.3 is applicable to the PSEG Site ESP application. This recommendation identifies the need for: (i) determining and implementing the required staffing for responding to a multi-unit event, and (ii) providing means to power communications equipment needed to communicate onsite and offsite during a prolonged station blackout.

The Applicant evaluated the applicability of Recommendation 9.3 and stated that because it has not selected a reactor technology, detailed designs of onsite and offsite communication systems and emergency staffing plans are not yet complete. After a reactor technology is selected at the COL stage, an assessment of on-site and off-site communication systems and equipment used during an emergency, and the emergency organization staffing levels, will be conducted to identify possible enhancements to ensure communications are maintained during a large scale natural event.

The Staff reviewed the Applicant’s submitted information and determined that permit conditions commensurate with the applicability of Recommendation 9.3, are necessary and adequate to address these aspects of the recommendation. Accordingly, the Staff identified Permit Conditions 5 and 6 (See FSER Section 13.3.4.3 and FSER Appendix A) (Ex. NRC003) that require a COL or construction permit applicant to address the communications and staffing aspects of Recommendation 9.3.

Q8: How did the Staff's safety review of the PSEG Site ESP application differ from that of the previous ESP applications, in light of the applicable Fukushima NTTF Recommendations?

A8: (PC) The Staff's safety review did not differ from the previous ESP application reviews with respect to areas addressed by the applicable Fukushima NTTF recommendations. Where consideration of the applicability of the NTTF recommendations was necessary (i.e., seismic and flooding hazards and, as discussed below, emergency planning) the Staff did not need to apply different review processes, methodologies, or guidance compared to those applied in previous ESP application reviews.

(BJM) With respect to emergency planning, the only previous ESP application comparable to the PSEG Site ESP application was the Vogtle Electric Generating Plant (VEGP) ESP application for Units 3 and 4, which was the only previous ESP applicant to seek approval of complete and integrated emergency plan for new reactors at an existing operating reactor site. The Staff's emergency planning review of the VEGP ESP application is included in Section 13.3 of the FSER (NUREG-1923, July 2009). However, the VEGP ESP (i.e., VEGP ESP-004) was issued on August 26, 2009, prior to the Fukushima Daiichi accident in 2011, and, therefore, did not address the emergency planning related aspects identified in NTTF Recommendation 9.3 (addressed above in the Staff's response associated with Permit Conditions 5 and 6).

Q9: How did the Staff address the Fukushima NTTF Recommendations during the environmental review?

A9: (DEP) As discussed in the response to Question 5 through 7, applicable NTTF Recommendations were considered in the PSEG Site ESP application safety review. The Staff also ensured that actions to be taken in response to the NTTF Recommendations were considered in the context of the potential environmental impacts of operation. This review is documented under the environmental review in the beginning of Section 5.11, "Environmental Impacts of Postulated Accidents," in the PSEG ESP FEIS (Ex. NRC004A).

Q10: With respect to the Fukushima events, what differences, if any, did the Staff identify in the environmental review of the PSEG Site ESP application, from that of the previous ESP applications, and where are the differences documented?

A10: (DEP) The EISs for all of the previously issued ESPs were published prior to the March 11, 2011, Great Tohoku earthquake and tsunami in Japan and so did not include an analysis of the event. The discussion of the Fukushima event in the PSEG ESP FEIS is documented on pages 5-97 through 5-100 in FEIS Section 5.11 "Environmental Impacts of Postulated Accidents" (Ex. NRC004A). This information did not require application of different review methodologies, or guidance compared to those applied in previous ESP application reviews.

Q11: Do the Staff's conclusions in the areas of the environmental review for which the Fukushima NTTF Recommendations were applicable, differ from those for the same areas in the previous ESPs? If so, explain the difference. If not, explain why.

A11: (DEP) No, as explained in the Staff's responses to Questions 7 through 9 above and in FEIS Section 5.11 (Ex. NRC004A), the Fukushima NTTF Recommendations that are applicable to the PSEG ESP application review are addressed under the safety review. None of the information the Staff has identified in their safety review about the Fukushima accident or the steps taken by the NRC or the Applicant to date to implement the Fukushima NTTF Recommendations suggests the need to use different methodologies, or guidance to assess seismic and flooding hazards or the available mitigation capability (e.g., passive safety systems). For these reasons, the NRC's analysis of the environmental impacts of design basis and severe accidents remains consistent with the methodology of the previous

ESPs and the conclusions presented in the FEIS appropriately considered the information associated with the events at Fukushima with a resulting environmental finding of SMALL, i.e., the environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource (as described in FEIS Section 5.11.4 (Ex. NRC004A)).

Q12: Does this conclude your testimony?

A12: (PC, JFG, HJ, DS, SDG, DEP, BJM) Yes.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
	)	Docket No. 52-043-ESP
PSEG POWER, LLC AND PSEG)	
NUCLEAR, LLC	)	ASLBP No. 15-943-01-ESP-BC01
)	
(Early Site Permit Application)	)	March 10, 2016

AFFIDAVIT OF PROSANTA CHOWDHURY

I, Prosanta Chowdhury, do hereby declare under penalty of perjury that my statements in the foregoing testimony and my statement of professional qualifications (Ex. NRC002) are true and correct to the best of my knowledge and belief. I attest to the accuracy of my testimony and endorse its inclusion into the record of this proceeding.

Executed in Accord with 10 CFR § 2.304(d)

Prosanta Chowdhury
Project Manager
Division of New Reactor Licensing
Office of New Reactors
U.S. Nuclear Regulatory Commission
Mail Stop T6- E55
Washington, DC 20555-0001
(301) 415-1647
Prosanta.Chowdhury@nrc.gov

Executed at Rockville, Maryland
This 10th day of March, 2016

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
	)	Docket No. 52-043-ESP
PSEG POWER, LLC AND PSEG)	
NUCLEAR, LLC	)	ASLBP No. 15-943-01-ESP-BC01
)	
(Early Site Permit Application)	)	March 10, 2016

AFFIDAVIT OF JOSEPH F. GIACINTO

I, Joseph F. Giacinto, do hereby declare under penalty of perjury that my statements in the foregoing testimony and my statement of professional qualifications (Ex. NRC002) are true and correct to the best of my knowledge and belief. I attest to the accuracy of my testimony and endorse its inclusion into the record of this proceeding.

Executed in Accord with 10 CFR § 2.304(d)

Joseph F. Giacinto
Hydrologist
Division of Site Safety and Environmental Analysis
Office of New Reactors
U.S. Nuclear Regulatory Commission
Mail Stop T7-E18
Washington, DC 20555-0001
(301) 415-0714
Joseph.Giacinto@nrc.gov

Executed at Rockville, Maryland
This 10th day of March, 2016

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
	)	Docket No. 52-043-ESP
PSEG POWER, LLC AND PSEG)	
NUCLEAR, LLC	)	ASLBP No. 15-943-01-ESP-BC01
)	
(Early Site Permit Application)	)	March 10, 2016

AFFIDAVIT OF HENRY JONES

I, Henry Jones, do hereby declare under penalty of perjury that my statements in the foregoing testimony and my statement of professional qualifications (Ex. NRC002) are true and correct to the best of my knowledge and belief. I attest to the accuracy of my testimony and endorse its inclusion into the record of this proceeding.

Executed in Accord with 10 CFR § 2.304(d)

Henry Jones, Ph.D.
Hydrologist
Division of Site Safety and Environmental Analysis
Office of New Reactors
U.S. Nuclear Regulatory Commission
Mail Stop T7-F27
Washington, DC 20555-0001
(301) 415-1463
Henry.Jones@nrc.gov

Executed at Rockville, Maryland
This 10th day of March, 2016

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
	)	Docket No. 52-043-ESP
PSEG POWER, LLC AND PSEG)	
NUCLEAR, LLC	)	ASLBP No. 15-943-01-ESP-BC01
)	
(Early Site Permit Application)	)	March 10, 2016

AFFIDAVIT OF DOGAN SEBER

I, Dogan Seber, do hereby declare under penalty of perjury that my statements in the foregoing testimony and my statement of professional qualifications (Ex. NRC002) are true and correct to the best of my knowledge and belief. I attest to the accuracy of my testimony and endorse its inclusion into the record of this proceeding.

Executed in Accord with 10 CFR § 2.304(d)

Dogan Seber
Senior Geophysicist
Division of Site Safety and Environmental Analysis
Office of New Reactors
U.S. Nuclear Regulatory Commission
Mail Stop T7-F3
Washington, DC 20555-0001
(301) 415-0212
Dogan.Seber@nrc.gov

Executed at Rockville, Maryland
This 10th day of March, 2016

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
	)	Docket No. 52-043-ESP
PSEG POWER, LLC AND PSEG)	
NUCLEAR, LLC	)	ASLBP No. 15-943-01-ESP-BC01
)	
(Early Site Permit Application)	)	March 10, 2016

AFFIDAVIT OF STEPHANIE DEVLIN-GILL

I, Stephanie Devlin-Gill, do hereby declare under penalty of perjury that my statements in the foregoing testimony and my statement of professional qualifications (Ex. NRC002) are true and correct to the best of my knowledge and belief. I attest to the accuracy of my testimony and endorse its inclusion into the record of this proceeding.

Executed in Accord with 10 CFR § 2.304(d)

Stephanie Devlin-Gill
Project Scientist
Division of Site Safety and Environmental Analysis
Office of New Reactors
U.S. Nuclear Regulatory Commission
Mail Stop T7-F3
Washington, DC 20555-0001
(301) 415-5301
Stephanie.Devlin-Gill@nrc.gov

Executed at Rockville, Maryland
This 10th day of March, 2016

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
	)	Docket No. 52-043-ESP
PSEG POWER, LLC AND PSEG)	
NUCLEAR, LLC	)	ASLBP No. 15-943-01-ESP-BC01
)	
(Early Site Permit Application)	)	March 10, 2016

AFFIDAVIT OF DR. DONALD PALMROSE

I, Dr. Donald Palmrose, do hereby declare under penalty of perjury that my statements in the foregoing testimony and my statement of professional qualifications (Ex. NRC002) are true and correct to the best of my knowledge and belief. I attest to the accuracy of my testimony and endorse its inclusion into the record of this proceeding.

Executed in Accord with 10 CFR § 2.304(d)

Dr. Donald Palmrose
Senior Reactor Engineer
Division of Site Safety and Environmental Analysis
Office of New Reactors
U.S. Nuclear Regulatory Commission
Mail Stop T7-F27
Washington, DC 20555-0001
(301) 415-3803
Donald.Palmrose@nrc.gov

Executed at Rockville, Maryland
This 10th day of March, 2016

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
	)	Docket No. 52-043-ESP
PSEG POWER, LLC AND PSEG)	
NUCLEAR, LLC	)	ASLBP No. 15-943-01-ESP-BC01
)	
(Early Site Permit Application)	)	March 11, 2016

AFFIDAVIT OF BRUCE J. MUSICO

I, Bruce J. Musico, do hereby declare under penalty of perjury that my statements in the foregoing testimony and my statement of professional qualifications (Ex. NRC002) are true and correct to the best of my knowledge and belief. I attest to the accuracy of my testimony and endorse its inclusion into the record of this proceeding.

Executed in Accord with 10 CFR § 2.304(d)

Bruce J. Musico
Senior Emergency Preparedness Specialist
Division of Preparedness
Office of Nuclear Security and Incident Response
U.S. Nuclear Regulatory Commission
Mail Stop 9-A44
Washington, DC 20555-0001
(301) 287-3724
Bruce.Musico@nrc.gov

Executed at Rockville, Maryland
This 11th day of March, 2016