


United States Nuclear Regulatory Commission Official Hearing Exhibit	
In the Matter of:	PSEG POWER, LLC AND PSEG NUCLEAR, LLC (Early Site Permit Application)
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NRC006R

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 2: VERIFICATION OF COMPLIANCE WITH PERMIT CONDITIONS

**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 (DNRL), Office of New Reactors (NRO), U.S. Nuclear Regulatory Commission (NRC). A statement of my professional qualifications is attached (Exhibit (Ex.) NRC002).

(ST) My name is Seshagiri Tammara. I am a Physical Scientist in the Radiation Protection and Accident Consequences Branch, Division of Site Safety and Environmental Analysis (DSEA), NRO, NRC. A statement of my professional qualifications is attached (Ex. NRC002).

(GLS) My name is Gerry Lewis Stirewalt. I am Senior Geologist in Geoscience and Geotechnical Engineering Branch 2, DSEA, NRO, NRC. A statement of my professional qualifications is attached (Ex. NRC002).

(FGV) My name is Frankie G. Vega and I am currently a Project Manager in the Hazard Management Branch, Japan Lessons Learned Division, Office of Nuclear Reactor Regulation. Before this, I was a Geotechnical Engineer in the Geoscience and Geotechnical Engineering Branch 1, DSEA, NRO, NRC. A statement of my professional qualifications is attached (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 (NSIR), NRC. A statement of my professional qualifications is attached (Ex. NRC002).

**Q2: Please describe your responsibilities with regard to the NRC Staff's review for the PSEG 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).

(ST) As a lead technical reviewer for the Site Safety Analysis Report (SSAR) Section 2.1, "Geography and Demography," and Section 2.2, "Identification of Potential Hazards in Site Vicinity," of the PSEG Site ESP application (Ex. PSEG004B), I was responsible for performing the technical evaluation and



writing the Staff's FSER for those two sections (Ex. NRC003), as well as presenting the NRC's conclusions about those two sections to the ACRS.

(GLS) As the lead geologist on the safety review of the PSEG Site ESP application, I was responsible for performing the technical evaluation of SSAR Sections 2.5.1, "Basic Geologic and Seismologic Information," and 2.5.3, "Surface Faulting," writing the Staff's FSER for those two sections, and presenting the NRC's conclusions about those two sections to the ACRS (Ex. PSEG004B and NRC003). As part of my review, I completed a field audit to directly examine the site physiography, exposed stratigraphic units, and the materials collected from subsurface boreholes, as well as to assess field information related to the presence of a proposed fault near the PSEG Site. I also made certain that geologic information about the PSEG Site was properly integrated with the technical fields of seismology and geotechnical engineering, as necessary.

(FGV) As the lead geotechnical engineer on the safety review of the PSEG ESP application, I was responsible for performing the technical evaluation of SSAR Sections 2.5.4, "Stability of Subsurface Materials and Foundations," and 2.5.5, "Stability of Slopes," writing the Staff's FSER for those two sections, and presenting those two sections to the ACRS (Ex. PSEG004B and NRC003). I also made certain that geotechnical engineering information about the PSEG Site was properly integrated with the technical fields of geology and seismology, as necessary.

(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, ST, GLS, FGV, BJM) The purpose of our testimony is to provide an explanation of why the Staff determined that Permit Conditions are required and why the specified conditions are appropriately defined.

**Q4. How did the Staff apply the standard that permit conditions must be "precisely drawn so that the verification of compliance becomes a largely ministerial . . . act" in determining the appropriate language for the conditions?**

**A4:** (PC) As set out in the detailed testimony that follows regarding the individual permit conditions, the Staff included sufficiently prescriptive detail in the permit conditions to ensure that its post-permitting compliance review will not require complex factual or legal judgments going beyond ministerial verification that the required actions have been completed. For example, the Staff used widely-accepted industry standards and terminology, the interpretation of which would not be subject to reasonable dispute; incorporated as requirements prescriptive methodologies and standards from particular guidance documents (see Staff Testimony on Permit Conditions 2 and 5-9); and established prescriptive compliance steps (e.g., requiring submission of a notification or confirmation that a specified action was taken) to the extent those steps were not already incorporated from other sources referenced in the conditions (see Staff Testimony on Permit Conditions 1 and 3-4). As a result, none of the verification actions for each of the conditions would be subject to any fundamental ambiguity.

In the remainder of this testimony, the Staff explains in more detail what largely ministerial actions it will perform to verify that each of the nine permit conditions are met. Many of these conditions are similar to conditions included in the ESPs for Vogtle, North Anna, Grand Gulf, and Clinton. However, each of the nine permit conditions for the PSEG Site ESP is crafted with specificity for particular issues relevant



to the PSEG Site ESP application review to require actions necessary to support or confirm the basis for the Staff's findings in the FSER. Therefore, as the Staff stated in its response to Question 9 of the Board's first round of prehearing questions (Ex. NRC007), verifying compliance with the proposed permit conditions would require only largely ministerial acts.

**Permit Condition 1:**

An applicant for a combined license (COL) or construction permit (CP) referencing this early site permit shall notify the Nuclear Regulatory Commission staff when the COL applicant has acquired the required authority and control over the Exclusion Area (prior to issuance of any combined license that references this ESP) and shall provide confirmation that the basis for that conclusion includes the following:

1. The COL or CP applicant shall complete the acquisition of 0.34 km<sup>2</sup> (85 ac.) of land, including mineral rights, from the USACE that is currently part of the confined disposal facility north of the site.
2. The COL or CP applicant shall modify the existing PSEG Site Radiological Emergency Response Plan and the existing PSEG Site Security Plan, and reach agreements with the U.S. Coast Guard (USCG), to extend the protections for the Delaware River portion of the existing Salem and Hope Creek Exclusion Area to cover the Delaware River portion of the Exclusion Area related to the ESP.
3. The COL or CP applicant shall reach agreement with the USACE for any land within the EAB that will not be owned by the COL applicant to obtain legal authority from the U.S. Army Corps of Engineers (USACE) to either allow the COL applicant and its surrogates to determine all activities including exclusion or removal of personnel and property from the area or require that the USACE exercise that control in the manner specified by the COL or CP applicant.

**Q5: Please summarize the requirements proposed in Permit Condition 1.**

**A5:** (ST) In SSAR Section 2.1, the Applicant stated that the COL or CP applicant shall: (1) complete the acquisition of 0.34 km<sup>2</sup> (85 ac) of land including mineral rights from the USACE that is currently part of the confined disposal facility north of the site; (2) modify the existing PSEG Site Radiological Emergency Response Plan and the existing PSEG Site Security Plan; and (3) reach agreements with the USCG (Ex. PSEG004B). The Applicant also stated that a COL or CP applicant shall also reach agreement with the USACE for land within the exclusion area boundary (EAB) that will not be owned by the COL applicant to obtain legal authority from the USACE to either allow the COL applicant and its surrogates to determine all activities including exclusion or removal of personnel and property from the area or require that the USACE exercise that control in the manner specified by the COL or CP applicant (Ex. PSEG004B). Consistent with the Applicant's commitment, the Staff proposed Permit Condition 1, which requires a COL or CP applicant to notify and provide confirmatory documentation to the Staff that the three commitments specified by the Applicant have been fulfilled, when the COL or CP applicant has acquired authority over portions of the Exclusion Area, as defined by 10 CFR 100.3 (Ex. NRC003).

**Q6: Please describe why the Staff determined that Permit Condition 1 is required.**

**A6:** (ST) The required information covered in Permit Condition 1 is being negotiated and is to be finalized at the COL or CP stage. Issuing the permit subject to this condition ensures that a COL or CP



applicant will possess the authority to determine all activities including the exclusion or removal of personnel and other individuals and property from the exclusion area before it receives authorization to construct or operate a nuclear power plant on the PSEG Site. By ensuring that a future COL or CP applicant must confirm that it has acquired this authority, Permit Condition 1 provides assurance of site suitability with respect to an acceptable exclusion area, and that, as a result, all land within the exclusion area will be covered by the appropriate site security and emergency plans.

**Q7: Please describe the process that the Staff anticipates it will use to verify compliance with Permit Condition 1.**

**A7:** (ST) The Staff will verify that a future COL or CP applicant referencing the PSEG Site ESP has complied with each of the specified items in Permit Condition 1 by verifying that the COL or CP applicant has provided information on the NRC docket for that application to indicate that the COL or CP applicant has completed each of the actions described in each item of Permit Condition 1.

**Q8: Describe how this verification process will require only ministerial action on the part of the Staff.**

**A8:** (ST) The Staff's process of verifying compliance with Permit Condition 1 requires only the ministerial action of verifying that the COL or CP applicant has provided the notification and prescriptively specified confirmatory information to show that each item discussed in Permit Condition 1 has been met. No technical judgements or analyses are required by the Staff to ensure compliance with Permit Condition 1.

**Q9: Is any additional language needed in Permit Condition 1 to ensure that the required site suitability determination can be made with respect to the detailed information covered in Permit Condition 1?**

**A9:** (ST) No.

**Permit Condition 2:**

An applicant for a COL or CP referencing this early site permit shall demonstrate that the nearest structures, systems, and components (SSCs) important to safety of the selected plant design can withstand the effects of potential explosions associated with the relocated gasoline storage tank and the gasoline delivery tanker truck. The applicant shall demonstrate this by using the methodologies provided in RG 1.91 and RG 1.78 for direct explosion and vapor cloud explosion, respectively, to confirm that a minimum safe distance exists between the nearest plant SSCs important to safety and the relocated gasoline storage tank and the gasoline delivery tanker truck such that the SSCs would not experience an overpressure in excess of 1.0 psi in the event of an explosion.

**Q10: Please summarize the requirements proposed in Permit Condition 2.**

**A10:** (ST) In SSAR Sections 2.2.3.4 and 2.2.3.5, the Applicant stated that the existing gasoline storage tank and the gasoline delivery tanker truck should be relocated and the potential hazards evaluated during the COL Stage (Ex. PSEG004B). Consistent with this commitment by the Applicant, the Staff identified Permit Condition 2 in the Staff's FSER Sections 2.2.3.4 and 2.2.3.5, which requires a COL or CP applicant to provide confirmation, based on the results of following prescriptive NRC-approved guidance, that the important to safety structures, systems, and components would not experience an explosion overpressure in excess of 1.0 psi (Ex. NRC003).



**Q11: Please describe why the Staff determined that Permit Condition 2 is required.**

**A11:** (ST) The Staff determined that Permit Condition 2 is required because information related to the relocation of the gasoline storage tank, the associated delivery of gasoline by a tanker truck, and the risk to important to safety SSCs due to explosion overpressure would not be available until the CP or COL stage when the COL or CP applicant selects a design and relocates the storage tank.

**Q12: Please describe the process that the Staff anticipates it will use to verify compliance with Permit Condition 2.**

**A12:** (ST) The staff will verify compliance with the permit condition by ensuring that a future COL or CP applicant referencing the PSEG Site ESP has submitted documentation in the COL or CP application to show that it has followed the methodology described in Regulatory Guide (RG) 1.91, "Evaluations of Explosions Postulated To Occur on Transportation Routes Near Nuclear Power Plants," and RG 1.78, "Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release," to demonstrate that the nearest SSCs important to safety of the selected plant design can withstand the effects of potential explosions associated with the relocated gasoline storage tank and the gasoline delivery tanker truck. Because Permit Condition 2 prescriptively specifies the applicable process and equations (by referencing prescriptive NRC-approved guidance) to verify that the risk of explosions is within acceptable limits, the Staff will only have to perform the ministerial action of confirming that the results of the COL or CP applicant's overpressure calculations are below 1.0 psi. Therefore, issuing the ESP subject to this condition will ensure that future actions specified in the permit condition would take place consistent with the Staff's site suitability determination at the ESP stage.

**Q13: Describe how this verification process will require only ministerial action on the part of the Staff.**

**A13:** (ST) The Staff's process of verifying compliance with Permit Condition 2 requires only the ministerial action of accessing the NRC docket for an application for a COL or CP referencing the PSEG Site ESP to verify the presence of information in the COL or CP application to show that the methodologies discussed in Permit Condition 2 have been used to reach the conclusion discussed in Permit Condition 2 regarding the relocation of the gasoline storage tank, the gasoline delivery tanker truck, and compliance with the permissible calculated overpressure.

**Q14: Is any additional language needed in Permit Condition 2 to ensure that the required site suitability determination can be made with respect to the detailed information covered in Permit Condition 2?**

**A14:** (ST) No.

**Permit Condition 3:**

An applicant for a COL or CP referencing this early site permit shall perform detailed geologic mapping of excavations for safety-related structures; examine and evaluate geologic features discovered in those excavations; and notify the Director of the Office of New Reactors, or the Director's designee, once excavations for safety-related structures are open for examination by NRC staff.



**Q15: Please summarize the requirements proposed in Permit Condition 3.**

**A15:** (GLS) In SSAR Section 2.5.4.5.4.1, the Applicant stated that geologic mapping for evaluation of mat foundation materials would include documentation of weathered zones and shear zones or fault traces, if observed (Ex. PSEG004B). Consistent with this commitment by the Applicant, the Staff identified Permit Condition 3 in FSER Section 2.5.3.5. Once a COL or CP applicant selects a design and determines the location of safety-related SSCs, Permit Condition 3 requires that excavations for safety-related SSCs be mapped in order to identify geologic features of concern (Ex. NRC003). The condition requires notification of the NRC so that the Staff can perform an inspection of the excavation.

**Q16: Please describe why the Staff determined that Permit Condition 3 is required.**

**A16:** (GLS) The geologic mapping of excavations for safety-related structures documents the CP or COL applicant's initial interpretations, based on data from boreholes and testing conducted from the surface to investigate the subsurface, regarding the presence or absence of deformation features of Quaternary age (i.e., less than 2.6 million years, or 2.6 Ma, old) in materials that will underlie the foundations of those structures. Tectonic and non-tectonic surface deformation features at the site that are Quaternary in age are of particular concern because features of that age are considered to have a higher likelihood of potentially affecting site suitability than deformation features that are older than 2.6 Ma. Guidance on the potential importance of deformation features of Quaternary age is provided in Appendix C "Investigations to Characterize Site Geology, Seismology and Geophysics" of RG 1.208 "A Performance-Based Approach to Define The Site-Specific Earthquake Ground Motion," as well as in Section 2.5.3, "Surface Faulting," of the SRP (NUREG-0800). If Quaternary deformation features are identified at the PSEG Site, additional characterization of those features could be necessary for assessment of site suitability, and additional mitigating actions during plant construction may need to be taken. Information to document the presence or absence of tectonic or non-tectonic surface deformation in foundation grade level materials at the PSEG Site is not currently available because the foundation materials (i.e., the Vincentown Formation, which is greater than 56.0 Ma in age) will not be exposed at the PSEG Site until the excavations for safety-related engineered structures are completed.

Implementation of Permit Condition 3 is necessary to document characteristics of geologic materials and features in the excavations for safety-related engineered structures at the CP or COL stage. Information related to the presence or absence of tectonic (e.g., zones of intense fracturing, faults, shear zones) or non-tectonic surface deformation features of Quaternary age in foundation grade level materials at the PSEG Site will be systematically collected by detailed geologic mapping. This information is essential for the Staff to confirm the presence or absence of tectonic or non-tectonic surface deformation features of Quaternary age in foundation grade level materials at the PSEG Site and verify the COL or CP applicant's interpretations about site suitability based on results of the geologic mapping. The Staff notes that the Commission has approved including this condition in the Summer, Fermi, and South Texas Project (STP) COLs. Similar conditions have also been included in the Grand Gulf and North Anna ESPs.

**Q17: Please describe the process that the Staff anticipates it will use to verify compliance with Permit Condition 3.**

**A17:** (GLS) The key provision in Permit Condition 3 is that, once the geologic mapping of the excavations and the examination and evaluation of geologic features are completed by the COL or CP applicant, the COL or CP applicant must notify the Staff when the excavations are open for examination so the Staff can carry out audits and inspections consistent with the NRC's established construction inspection program. Verification of compliance with Permit Condition 3 requires only the ministerial action of verifying that the COL or CP applicant has completed the geologic mapping and notified the



NRC. As such, only ministerial action is needed on the part the Staff to verify compliance with this permit condition because the focus of the verification action is not on the substantive results of the geologic mapping, the assessment of which is discussed in the following paragraph, but rather on ensuring notification of the Staff.

After verification of compliance, the Staff will perform an independent and objective examination and evaluation of the excavations for safety-related structures in light of the results of the geologic mapping done by the COL or CP applicant, which is completed as part of the construction inspection program. The Staff will also assess the acceptability of the COL or CP applicant's geologic mapping methods to ensure that standard procedures applied under an NRC-approved Quality Assurance Program were used for the geologic mapping activities. The objective examination and evaluation of materials and geologic features found in the excavations will be conducted by the Staff in accordance with guidance in RG 1.132, "Site Investigations for Foundations of Nuclear Power Plants," during site field audits and inspections with the primary goal of confirming the COL or CP applicant's descriptions of the presence or absence of Quaternary age tectonic or non-tectonic surface deformation at the site. The independent field observations made by the Staff will be directly compared to the geologic mapping results provided by the COL or CP applicant during the site audits and inspections to determine the acceptability of the mapping results. The Staff will prepare reports summarizing the conclusions made with regard to the presence or absence of tectonic or non-tectonic surface deformation features of Quaternary age in foundation grade level materials at the PSEG Site. These conclusions will be incorporated into the audit and inspection reports written for the NRC's construction inspection program. This information would be considered as necessary in the staff's evaluation of the engineering features of a plant proposed under a COL.

**Q18: Is any additional language needed in Permit Condition 3 to ensure that the required site suitability determination can be made with respect to the detailed geologic mapping performed by the COL or CP applicant for documenting the presence or absence of tectonic or non-tectonic features in the excavations for safety-related engineered structures at the PSEG site?**

**A18:** (GLS) No.

**Permit Condition 4:**

An applicant for a COL or CP referencing this early site permit shall remove and replace the soils directly above the Vincentown Formation for soils under or adjacent to Seismic Category I structures to minimize any liquefaction potential.

**Q19: Please summarize the requirements proposed in Permit Condition 4.**

**A19:** (FGV) In SSAR Section 2.5.4.7.4.1, the Applicant stated that the soils above the Vincentown Formation present unsuitable engineering characteristics with shear wave velocities less than 304.8 m/s (1,000 ft/s) (Ex. PSEG004B). The Applicant stated that they will remove these soils from the area of safety-related structures to reach the competent material and replace it with a suitable backfill (Ex. PSEG004B). The Applicant stated that the top of the competent layer is located, in the Vincentown Formation, at approximately elevation -67 ft North American Vertical Datum (Ex. PSEG004B). Consistent with the Applicant's commitments described in SSAR Section 2.5.4.7.4.1, the Staff identified Permit Condition 4, which requires removal and replacement of soils within a prescribed area - i.e., soils above the Vincentown Formation that would be under or adjacent to Seismic Category I structures - to minimize any liquefaction potential (Ex. NRC003).

**Q20: Please describe why the Staff determined that Permit Condition 4 is required.**



**A20:** (FGV) Site soils above the Vincentown Formation, composed of soft clays or silts and loose sands with shear wave velocities less than 304.8 m/s (1,000 ft/s), are of particular concern because they are considered unsuitable for the loadings that would be imposed by any of the reactor technologies considered in the PSEG Site ESP application. The purpose of Permit Condition 4 is to ensure that the Staff's concern is adequately addressed at the COL or CP stage.

Implementation of Permit Condition 4 is important because the removal and replacement of soils above the Vincentown Formation with competent material will provide adequate bearing capacity for safety-related structures and will minimize liquefaction potential at the PSEG Site. The Staff notes that similar permit conditions were included in the Vogtle COL and Clinton, Vogtle, and North Anna ESPs.

**Q21: Please describe the process that the Staff anticipates it will use to verify compliance with Permit Condition 4.**

**A21:** (FGV) Verification of compliance with Permit Condition 4 requires only the ministerial action of verifying that the COL or CP applicant has completed the removal of soils above the Vincentown Formation and has replaced them with a suitable backfill. As such, only ministerial action is needed to ensure compliance with this permit condition.

After the COL or CP applicant complies with the removal and replacement requirements of Permit Condition 4, the Staff will inspect the backfill placed above the Vincentown Formation in accordance with an ITAAC. This ITAAC will include the inspection, testing and acceptance criteria for backfill to ensure a shear wave velocity of 304.8 m/s (1,000 ft/s) or higher below Seismic Category I structures. The objective examination and evaluation of materials found in the excavations is conducted by the Staff in accordance with guidance in RG 1.132 during site field audits and inspections as part of the construction inspection program with the primary goal of confirming the COL or CP applicant's descriptions of the foundation conditions at the PSEG Site. The Applicant's commitment to include this ITAAC was included in SSAR Section 2.5.4.5.3.3.2 (Ex. PSEG004B). Consistent with this commitment, the Staff identified COL Action Item 2.5-8 as follows (Ex. NRC003):

*An applicant for a COL or CP referencing this early site permit should include in the COL application, an ITAAC for the soil backfill, with specifications to ensure a Vs of 304.8 m/s (1,000 ft/s) or higher below Seismic Category I structures.*

**Q22: Is any additional language needed in Permit Condition 4 to ensure that the required site suitability determination can be made with respect to the removal and replacement of the soils directly above the Vincentown Formation for soils under or adjacent to Seismic category I structures to reduce any liquefaction potential PSEG site?**

**A22:** (FGV) No.

**Permit Conditions 5 through 9:**

**Permit Condition 5:** An applicant for a COL or CP referencing this early site permit shall propose a license condition for the licensee to perform the following: (i) No later than 18 months before the latest date set forth in the schedule submitted in accordance with 10 CFR 52.99(a) for completing the inspections, tests, and analyses in the ITAAC, the licensee shall have performed an assessment of on-site and augmented staffing capability for responding to a multi-unit event. The staffing assessment shall be performed in accordance with the latest NRC-endorsed revision of NEI 12-01, "Guidance for Assessing Beyond Design Basis Accident



Response Staffing and Communications Capabilities,” (ii) At least one hundred eighty (180) days before the date scheduled for initial fuel loading, as set forth in the notification submitted in accordance with 10 CFR 52.103(a), the licensee shall complete implementation of corrective actions identified in the staffing assessment described above and identify how the augmented staff will be notified given degraded communications capabilities, including any related emergency plan and implementing procedure changes and associated training.

**Permit Condition 6:** An applicant for a COL or CP referencing this early site permit shall propose a license condition for the licensee to perform the following: (i) No later than 18 months before the latest date set forth in the schedule submitted in accordance with 10 CFR 52.99(a) for completing the inspections, tests, and analyses in the ITAAC, the licensee shall have performed an assessment of on-site and off-site communications systems and equipment relied upon during an emergency event to ensure communications capabilities can be maintained during an extended loss of ac power. The communications capability assessment shall be performed in accordance with the latest NRC-endorsed revision of NEI 12-01, “Guidance for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities,” (ii) At least one hundred eighty (180) days before the date scheduled for initial fuel loading, as set forth in the notification submitted in accordance with 10 CFR 52.103(a), the licensee shall complete implementation of corrective actions identified in the communications capability assessment described above, including any related emergency plan and implementing procedure changes and associated training.

**Permit Condition 7:** An applicant for a COL or CP referencing this early site permit shall revise the emergency plan to describe on-shift personnel assigned emergency plan implementing functions associated with the chosen reactor technology and the number of proposed reactor units. In addition, the COL or CP applicant shall propose a license condition for the licensee to perform the following: (i) No later than 18 months before the latest date set forth in the schedule submitted in accordance with 10 CFR 52.99(a) for completing the inspections, tests, and analyses in the ITAAC, the licensee shall have performed an on-shift staffing analysis in accordance with the latest NRC-endorsed revision of NEI 10-05, “Assessment of On-Shift Emergency Response Organization Staffing and Capabilities,” (ii) At least one hundred eighty (180) days before the date schedule for initial fuel loading, as set forth in the notification submitted in accordance with 10 CFR 52.103(a), the licensee shall incorporate any changes to the emergency plan needed to bring staffing to the required levels.

**Permit Condition 8:** An applicant for a COL or CP referencing this early site permit and the AP1000 standard design shall propose a license condition for the licensee to develop an Emergency Action Level (EAL) scheme with fully developed site-specific EALs, in accordance with the latest NRC-endorsed revision of NEI 07-01, “Methodology for Development of Emergency Action Levels, Advanced Passive Light Water Reactors,” with few or no deviations or differences. All deviations or differences from NEI 07-01 must be fully described in the COL application, including providing the initiating condition, operating modes, notes, EAL threshold(s), basis information, and developer guidance for how a particular setpoint is (or will be) determined. The EALs shall have been discussed and agreed upon with State and local officials. The fully developed site-specific EAL scheme shall be submitted to the NRC at least one hundred eighty (180) days before the date scheduled for initial fuel loading, as set forth in the notification submitted in accordance with 10 CFR 52.103(a).

**Permit Condition 9:** An applicant for a COL or CP referencing this early site permit and the U.S. EPR, ABWR, or US-APWR standard design shall propose a license condition for the licensee to develop an Emergency Action Level (EAL) scheme with fully developed site-specific



EALs, in accordance with the latest NRC-endorsed revision of NEI 99-01, "Methodology for Development of Emergency Action Levels," with few or no deviations or differences, other than those attributable to the specific reactor design. All deviations or differences from NEI 99-01 must be fully described in the COL application, including providing the initiating condition, operating modes, notes, EAL threshold(s), basis information, and developer guidance for how a particular setpoint is (or will be) determined. The EALs shall have been discussed and agreed upon with State and local officials. The fully developed site-specific EAL scheme shall be submitted to the NRC at least one hundred eighty (180) days before the date scheduled for initial fuel loading, as set forth in the notification submitted in accordance with 10 CFR 52.103(a).

**Q23: Please provide a brief overview of Permit Conditions 5 through 9, including a detailed description of how verification of compliance with each proposed permit condition can be accomplished by largely ministerial action. In addition, for Permit Conditions 8 and 9, explain how a future applicant must develop emergency plans that contain "few or no deviations or differences" from the NRC-endorsed standards for the development of the EAL scheme.**

**A23:** (BJM) Permit Conditions 5 through 9 (discussed below) address the requirements for COL licensees to perform staffing and communications capability assessments, and to develop an EAL scheme, in support of their emergency plan. The performance of these assessments and development of the EAL scheme shall be in accordance with the Nuclear Energy Institute (NEI) technical documents referenced in the permit conditions, which were developed by NEI to specifically address the requirements, and have been endorsed by the NRC for that specific purpose.

When a COL applicant references the PSEG Site ESP, the ESP permit conditions will carry forward into the COL as license conditions, including only the EAL scheme permit condition that reflects the chosen reactor technology (e.g., Permit Condition 8 for the AP1000 design). The completion of the license conditions by the licensee is dependent upon the availability of various plant and emergency plan program details, which reflect the as-built plant and final emergency plan implementing procedures.

### **Permit Conditions 5 and 6**

Permit Conditions 5 and 6 require a licensee to complete a staffing assessment and communications capability assessment, respectively, in accordance with the referenced technical document, NEI 12-01 (ADAMS Accession No. ML111751698). NEI 12-01 provides detailed criteria to assist with the licensee's preparation of both the staffing and communications capability assessments, which are necessary for responding to NRC Fukushima Dai-ichi Near-Term Task Force (NTTF) Recommendation 9.3.<sup>1</sup> The assessment criteria in NEI 12-01 reflects the nuclear industry's phased approach for completion of the staffing assessment, which also addresses on-shift staffing using the methodology in NEI 10-05 (ADAMS Accession No. ML111751698), (addressed below for Permit Condition 7). In its letter dated May 15, 2012 (ADAMS Accession No. ML12131A043), the Staff found that the guidance in NEI 12-01 is an acceptable method for licensees to employ when addressing NTTF Recommendation 9.3.

The accident at Fukushima Dai-ichi highlighted the need to 1) determine and implement the required staff to fill all necessary positions responding to a multi-unit event, 2) ensure that the communication equipment relied upon to coordinate the event response during a prolonged station blackout can be

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<sup>1</sup> See SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan," July 12, 2011, and the associated Staff Requirements Memorandum, dated August 19, 2011.



powered, and 3) recognize the importance of having a multi-unit dose assessment capability when responding to a similar event.

NTTF Recommendation 9.3 addresses maintaining power to communications systems during a prolonged station blackout, and having the on-site and augmented staff to respond to a multi-unit event with a loss of all alternating current power and impeded access to the site. The inclusion of Permit Conditions 5 and 6 reinforces the Staff's analysis of the on-site emergency organization (addressed in FSER Section 13.3.4.3.2) and emergency communications (addressed in SER Section 13.3.4.3.6), and supports the Staff's respective conclusions in support of the reasonable assurance finding (Ex. NRC003).

The FSER for the ESP application documents the Staff's review of the staffing and communications capabilities, and will be supplemented with the submittal of the staffing and communications capabilities assessments 180 days prior to initial fuel load (Ex. NRC003). This 180-day review is not a technical review, as the Staff's detailed technical review was already performed as part of the ESP application process, and reflected in the ESP FSER (Ex. NRC003). As such, the 180-day review merely confirms, as a largely ministerial action, that the staffing and communications capability assessments have been performed in accordance with the objective criteria in NEI 12-01.

#### **Permit Condition 7**

Permit Condition 7 requires a licensee to perform an on-shift staffing analysis in accordance with NEI 10-05 in order to meet the requirements in Section IV.A.9 of 10 CFR Part 50, Appendix E. NEI 10-05 establishes a standard methodology for performing analyses of the ability of on-shift staff to perform all required functions and tasks necessary to respond to a declared emergency, without being assigned additional responsibilities that could detract from the performance of their primary emergency plan functions.

A licensee may modify the methodology to consider site-specific staffing, or other factors such as response commitments or technology. When completed, the staffing analysis results are incorporated into the site's emergency plan, and the staffing analysis must be retained and available for subsequent regulatory inspection. The NRC does not approve the staffing analysis. The NRC endorsed NEI 10-05 in NSIR/DPR-ISG-01, Section IV.C, "On-Shift Staffing Analysis," which states, in part, that NEI 10-05 establishes a standard methodology for a licensee to perform the required staffing analysis, and that the NRC has reviewed NEI 10-05 and found it to be an acceptable methodology for this purpose.

As discussed above under Permit Conditions 5 and 6, both the NTTF Recommendation 9.3 staffing assessment (addressed in NEI 12-01) and on-shift staffing analysis (addressed in NEI 10-05) are performed using a phased approach. NEI 12-01 specifically incorporates the use of the objective criteria in NEI 10-05, which provides the methodology to perform the on-shift staffing analysis.

#### **Permit Conditions 8 and 9**

Permit Conditions 8 and 9 require a licensee to develop an EAL scheme with fully developed site-specific EALs in accordance with EAL scheme guidance, consisting of either NEI 07-01, "Methodology for Development of Emergency Action Levels, Advanced Passive Light Water Reactors," or NEI 99-01, "Methodology for Development of Emergency Action Levels," with few or no deviations or differences, and reflecting the reactor design chosen by the COL applicant. COL applicants, and ESP applicants with complete and integrated emergency plans, typically do not have all of the information available to them to allow for the submittal of a complete EAL scheme, as many of the set-points and instrumentation/alarm names and identifications needed for the EAL scheme will not be determined



until the nuclear plant is built. However, the issuance of a license requires the Staff to reach a final decision as to whether the Applicant meets the EAL scheme requirements of 10 CFR 50.47(b)(4) and Section IV.B of 10 CFR Part 50, Appendix E.

A major difference between an ESP and a COL is that the COL grants the authority to construct and operate the facility, while the ESP simply resolves site suitability issues for a postulated plant – and in the case of the PSEG Site ESP application, pre-approves the emergency plan, subject to any COL action items and permit conditions. From an emergency preparedness perspective, issuance of a COL means that the Staff has reviewed the applicant's proposed emergency plan, and finds that it satisfies the applicable rules and guidance; subject to any license conditions. For an ESP application with a complete and integrated emergency plan, the applicant must commit to an NRC-endorsed EAL scheme development guidance document (template) (i.e., NEI 99-01 or NEI 07-01) with few or no deviations or differences, or provide specific deviations or differences for Staff review and approval as part of the ESP application.

As discussed in FSER Section 13.3.4.3.4, PSEG stated that the COL applicant will commit to adopt its EAL scheme using either NEI 99-01 or NEI 07-01, as appropriate, and that any deviations or differences from the applicable template will be justified at that time. NRC Regulatory Issue Summary (RIS) 2003-18, Supplement 2, "Use of Nuclear Energy Institute (NEI) 99-01, Methodology for Development of Emergency Action Levels" (ADAMS Accession No. ML051450482) provides the following definitions for *deviations* and *differences*.

*A deviation is an EAL change where the basis scheme guidance differs in wording and is altered in meaning or intent, such that classification of the event could be different between the basis scheme guidance and the site-specific proposed EAL. Examples of deviations include the use of altered mode applicability, altering key words or time limits, or changing words of physical reference (protected area, safety-related equipment, etc.).*

*A difference is an EAL change where the basis scheme guidance differs in wording but agrees in meaning and intent, such that classification of an event would be the same, whether using the basis scheme guidance or the site-specific proposed EAL. Examples of differences include the use of site-specific terminology or administrative re-formatting of site-specific EALs.*

(Emphasis included.) For the AP1000 and ESBWR reactor designs, NEI 07-01 must be used to develop the EAL scheme. For all other reactor designs, NEI 99-01 must be used. Both NEI 07-01 and NEI 99-01 contain detailed developer guidance information to direct how the specific set-points and instrumentation are to be developed. Applicants that choose to adopt the EAL scheme in either NEI document must commit to developing the EAL scheme with few or no deviations or differences. Applicants that choose to deviate from either endorsed guidance document (template) must submit at the COL application stage, for Staff review and approval, the proposed EALs with adequate justification to support the Staff's review finding of adequacy.

The safety evaluation for the COL will document the Staff's review of any identified deviations or differences, and incorporate the approval of these deviations or differences as a supplement to the approval of the NEI EAL scheme development guidance that the applicant has committed to. The Staff will determine whether the NEI EAL scheme guidance, supplemented with the deviations or differences, meets the requirements in 10 CFR 50.47(b)(4) and Section IV.B of 10 CFR Part 50, Appendix E. In addition, at least 180 days prior to initial fuel load, the Staff will confirm that the EALs developed by the licensee have been developed in accordance with either NEI 07-01 or NEI 99-01, with any applicable pre-approved deviations or differences. This 180-day review is not a technical review, as the Staff's detailed technical review would already have been performed as part of the COL application process,



and reflected in the COL FSER. As such, the 180-day review merely confirms, as a largely ministerial action, that the final EALs were developed in accordance with the prescriptive criteria defined in either NEI 07-01 or NEI 99-01, including any applicable pre-approved deviations or differences.

**Q24: Is any additional language needed in Permit Conditions 5 through 9 to ensure that the emergency plan provides reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at the PSEG Site?**

**A24:** (BJM) No.

**Q25: Does this conclude your testimony?**

**A25:** (PC, ST, GLS, FGV, 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 9, 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  
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Executed at Rockville, Maryland  
This 9th day of March, 2016



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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PSEG POWER, LLC AND PSEG	)	
NUCLEAR, LLC	)	ASLBP No. 15-943-01-ESP-BC01
	)	
(Early Site Permit Application)	)	March 9, 2016

AFFIDAVIT OF SESHAGIRI TAMMARA

I, Seshagiri Tammara, 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)**

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This 9th day of March, 2016



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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NUCLEAR, LLC	)	ASLBP No. 15-943-01-ESP-BC01
	)	
(Early Site Permit Application)	)	March 9, 2016

AFFIDAVIT OF GERRY L. STIREWALT

I, Gerry L. Stirewalt, 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)**

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NUCLEAR, LLC	)	ASLBP No. 15-943-01-ESP-BC01
	)	
(Early Site Permit Application)	)	March 9, 2016

AFFIDAVIT OF FRANKIE G. VEGA

I, Frankie G. Vega, 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)**

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Executed at Rockville, Maryland  
This 9th day of March, 2016



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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	)	
(Early Site Permit Application)	)	March 9, 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)**

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This 9th day of March, 2016