

13.0 CONDUCT OF OPERATIONS

13.3 Emergency Planning

13.3.1 Introduction

This section addresses the plans, design features, facilities, functions, and equipment necessary for radiological emergency planning (EP) that must be considered in an early site permit (ESP) application (hereinafter referred to as “ESPA” or “application”) that includes a complete and integrated emergency plan. This section includes both the applicant’s onsite emergency plan and State and local (offsite) emergency plans, which the U.S. Nuclear Regulatory Commission (NRC) and the Federal Emergency Management Agency (FEMA) evaluated to determine whether the plans are adequate, and that there is reasonable assurance that they can be implemented. The emergency plans are an expression of the overall concept of operation and describe the essential elements of advance planning that have been considered, as well as the provisions that have been made to cope with radiological emergency situations.

PSEG Power, LLC, and PSEG Nuclear, LLC (hereinafter referred to as “PSEG Nuclear”), are the applicants for the ESP (hereinafter referred to as “PSEG” or “applicant”). PSEG submitted its ESPA on May 25, 2010, for approval of a site for construction of either a single or dual unit light-water reactor (LWR) plant (hereinafter referred to as “new unit” or “new plant”). The proposed site is located on the southern part of Artificial Island on the east bank of the Delaware River in Lower Alloways Creek Township, Salem County, NJ. The NRC docketed the application on August 4, 2010 (Docket No. 52-043). PSEG submitted Revision 1 of its ESPA on May 21, 2012, and Revision 2 of its ESPA on March 27, 2013.

Designated by the applicant as the “PSEG Site,” the site is approximately 29 kilometers (km) (18 miles (mi)) south of Wilmington, DE, and 48 km (30 mi) southwest of Philadelphia, PA. The PSEG Site is located adjacent to three existing reactors, Salem Generating Station (SGS), Units 1 & 2, and Hope Creek Generating Station (HCGS), Unit 1 (hereinafter referred to as “SGS/HCGS site”), and will consist of an 819-acre area north of HCGS. PSEG Nuclear is the licensee for SGS and HCGS. The ESPA takes advantage of the EP resources, capabilities, and organization that currently exist at the SGS and HCGS site. For purposes of EP, given the new plant’s proximity to the existing reactors, little distinction exists between the existing reactor units and the new plant proposed to be located on the PSEG Site.

The applicant has submitted a complete and integrated emergency plan for the new plant under Title 10 of the *Code of Federal Regulations* (10 CFR) 52.17(b)(2)(ii), which consists of the PSEG Site Emergency Plan in Part 5 of the ESPA (hereinafter referred to as “emergency plan” or “ESP Plan”), and supplemental information that includes the offsite radiological emergency response plans (RERPs) for the States of New Jersey, Delaware, and Maryland, and the Commonwealth of Pennsylvania. The PSEG Site evacuation time estimate (ETE) report (hereinafter referred to as “ETE Report”) is included as Attachment 11 to the ESP Plan. (The ETE Report is discussed in Sections 13.3.4.1 and 13.3.4.3.17 of this report.) Revisions 1 and 2 of this ESPA included Revisions 1 and 2 of the ESP Plan, respectively.

As described below, in consultation with FEMA, the staff reviewed the ESPA, the applicant’s responses to requests for additional information (RAIs), and generally available reference materials in accordance with the guidance provided in the Standard Review Plan (SRP)

(i.e., NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Revision 3, March 2007), Section 13.3, "Emergency Planning," and Section 14.3.10, "Emergency Planning – Inspections, Tests, Analyses, and Acceptance Criteria." FEMA reviewed the offsite RERPs and on January 19, 2011, provided the NRC with its Interim Finding Report for Reasonable Assurance of the offsite emergency response plans for the PSEG Site. In a December 13, 2011, letter, the NRC provided FEMA with updated New Jersey and Delaware RERPs. In its March 21, 2012, response, FEMA stated that the FEMA Region II and Region III Radiological Emergency Preparedness Offices reviewed the updated New Jersey and Delaware RERPs for the PSEG Site, and confirmed that the January 19, 2011, findings are still valid. The staff reviewed the FEMA findings, and the overall FEMA conclusions are reflected below in Sections 13.3.4 and 13.3.5 of this report.

Since the specific reactor type for the PSEG Site has not been selected, technical information from various reactor designs is used to develop bounding parameters (i.e., a plant parameter envelope (PPE)) intended to envelop the proposed facility characterization necessary to evaluate the suitability of the site for future construction and operation of a nuclear power plant. The choice of reactor type will be made by a combined license (COL) applicant that uses the ESP as a reference for the PSEG Site.

13.3.2 Summary of Application

Site Safety Analysis Report (SSAR) (ESPA Part 2), Section 13.3, "Emergency Plan," describes EP for the addition of a new plant at the PSEG Site, and addresses the submission of a complete and integrated emergency plan, which is contained in Part 5 of the ESPA. SSAR Section 13.3 addresses the physical characteristics of the PSEG Site, the emergency planning zones (EPZs) for the new plant, ETEs, and contacts and arrangements with local, State, Federal, and other organizations with supporting emergency responsibilities. In the ESPA, the applicant also provided the following emergency plan information.

Onsite Emergency Plan

As described in the SSAR, the ESPA emergency plan for a new plant at the PSEG Site is provided in ESPA Part 5, and consists of a Basic Plan and 11 attachments. The ESP Plan is based on the existing SGS and HCGS Emergency Plan,, and consists of a complete and integrated emergency plan. The Basic Plan is structured to follow the 16 planning standards in NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1 (hereinafter referred to as "NUREG-0654"). The 11 attachments (listed below) provide additional detailed information on specific aspects of EP.

- Attachment 1: Typical Contents to Emergency Documents
- Attachment 2: Certification Letters
- Attachment 3: Memoranda of Understanding
- Attachment 4: Radiological Assistance Program
- Attachment 5: Emergency Action Levels
- Attachment 6: AP1000 – Specific Information

- Attachment 7: ABWR – Specific Information
- Attachment 8: US-APWR – Specific Information
- Attachment 9: U.S. EPR – Specific Information
- Attachment 10: Emergency Planning – Inspections, Tests, Analyses, and Acceptance Criteria (EP-ITAAC)
- Attachment 11: PSEG Site – Development of Evacuation Time Estimates (ETE Report No. KLD TR-445)

Offsite Emergency Plans

The ESPA includes supplemental information consisting of the offsite RERPs for the States of New Jersey, Delaware, and Maryland, and the Commonwealth of Pennsylvania.

13.3.3 Regulatory Basis

The applicable regulatory requirements and guidance for evaluation of the emergency planning information submitted in an ESPA are:

- For an ESPA submitted pursuant to Subpart A, “Early Site Permits,” of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants,” that includes a complete and integrated emergency plan, 10 CFR 52.17(b)(2)(ii) requires that the emergency plans meet the applicable standards of 10 CFR 50.47, “Emergency plans,” and the requirements of 10 CFR Part 50, Appendix E. The staff also considered the applicable requirements in 10 CFR 50.33(g), 10 CFR 52.17(b)(3), 10 CFR 52.17(b)(4), 10 CFR 50.72, “Immediate notification requirements for operating nuclear power reactors,” 10 CFR 52.18, “Standards for review of applications,” and 10 CFR 100.21, “Non-seismic siting criteria.”
- NUREG-0800 identifies NUREG-0654 and other related guidance that the staff should consider during its review. The related acceptance criteria are identified in Section II, “Acceptance Criteria,” NUREG-0800, Section 13.3, and the applicable regulatory guidance for reviewing emergency preparedness as an operational program is established in NUREG-0800, Section 13.4, “Operational Programs.” In addition, the staff considered Interim Staff Guidance (ISG) NSIR/DPR-ISG-01, Revision 0, “Emergency Planning for Nuclear Power Plants” (ADAMS Accession No. ML113010523). (NSIR/DPR-ISG-01, Revision 0, “Emergency Planning for Nuclear Power Plants,” November 2011, provides updated guidance based on changes to EP regulations in 10 CFR 50.47 and 10 CFR Part 50, Appendix E, which were published as a Final Rule in the *Federal Register* (FR) on November 23, 2011 (76 FR 72560)).
- 44 CFR Part 350, “Review and Approval of State and Local Radiological Emergency Plans and Preparedness,” and 44 CFR Part 352, “Commercial Nuclear Power Plants: Emergency Preparedness Planning,” provide procedures for the review and evaluation of the adequacy of offsite radiological emergency planning and preparedness. In addition, FEMA considered NUREG-0654 (FEMA-REP-1), the Radiological Emergency Preparedness (REP) Program Manual, current FEMA guidance documents, and established industry practices. Pursuant to 44 CFR Part 353, “Fee for Services in Support, Review, and Approval of State and Local

Government or Licensee Radiological Emergency Plans and Preparedness,” Appendix A, “Memorandum of Understanding Between NRC and FEMA Relating to Radiological Emergency Planning and Preparedness” (58 FR 47996, September 14, 1993), FEMA provided its findings and determinations on offsite planning and preparedness to the NRC for its use in the licensing process.

13.3.4 Technical Evaluation

Pursuant to 10 CFR 52.17(b)(1), an ESPA must identify in the SSAR physical characteristics of the proposed site, such as egress limitations from the area surrounding the site, that could pose a significant impediment to the development of emergency plans. If such physical characteristics are identified, the application must identify measures that would, when implemented, mitigate or eliminate the significant impediment.

In addition, 10 CFR 52.17(b)(2) allows an ESP applicant to also propose either major features of emergency plans or a complete and integrated emergency plan, in accordance with the pertinent standards of 10 CFR 50.47 and 10 CFR Part 50, Appendix E. Major features of emergency plans are defined in 10 CFR 52.1, as aspects of those plans necessary to address in whole or part one or more of the 16 planning standards in 10 CFR 50.47(b), or a description of the EPZs as required by 10 CFR 50.33(g). (Before the amendment of 10 CFR Part 52 in 2007 (see 72 FR 49517, August 28, 2007), “major features” were defined in NUREG-0654, Supplement 2, “Criteria for Emergency Planning in an Early Site Permit Application,” Section III Draft Report for Comment, published April 1996.) For a complete and integrated emergency plan, 10 CFR 52.17(b)(4) requires that the applicant make good-faith efforts to obtain certifications from local, State, and Federal governmental agencies with emergency planning responsibilities. In addition, 10 CFR 52.17(b)(3) requires that the emergency plans (i.e., the ESP Plan) include the proposed inspections, tests, analyses, and acceptance criteria (ITAAC) that will provide reasonable assurance that the facility has been constructed and will be operated in conformity with the emergency plans, the *Atomic Energy Act of 1954*, and NRC regulations. Additional guidance applicable to ESP applications is provided in NUREG-0654, Supplement 2.

PSEG proposed a complete and integrated emergency plan for the new plant pursuant to 10 CFR 52.17(b)(2)(ii). The SSAR states that PSEG has not selected a reactor technology to be built at the PSEG Site, or the number of proposed reactor units based on a selected design. Therefore, attachments to the emergency plan are developed to address information specific to these four technologies considered by the applicant.

- Single Unit U.S. Evolutionary Power Reactor (U.S. EPR)
- Single Unit Advanced Boiling Water Reactor (ABWR)
- Single Unit U.S. Advanced Pressurized Water Reactor (US-APWR)
- Dual Unit Advanced Passive 1000 (AP1000)

The new plant on the PSEG Site may be any of the reactor designs identified, or a different design that falls within the site characteristics and the range of the information developed to characterize the new plant. Until a reactor design is selected, the emergency plan for the new plant will use a generic PPE as a placeholder. The combination of PPE values and site characteristics that form the licensing basis for NRC issuance of the ESP are identified in the SSAR. The SSAR further states that the emergency plan will be revised after the selection of the reactor technology. The demonstration of the emergency plan performance cannot be

completed until portions of the facility have been constructed. To support demonstration, ITAAC are included as an attachment to the emergency plan.

The staff reviewed the information in the ESPA, including SSAR Section 13.3, "Emergency Plan," and the complete and integrated emergency plan (ESP Plan), for conformance with applicable standards and requirements identified in NUREG-0800, Sections 13.3 and 14.3.10, and confirmed that the ESPA addresses the required information relating to EP. The complete set of emergency planning ITAAC for the new plant is provided below in Table 13.3-1 of this report, and various ITAAC are discussed throughout this section of the report. In addition, the staff reviewed selected portions of the emergency response plans for the States of New Jersey, Delaware, Maryland, and the Commonwealth of Pennsylvania for understanding and content, in relation to consistency with various sections of the ESP Plan that address offsite support and response. The staff also conducted two site area visits to the PSEG Site on May 6 and 7, 2010, consisting of a review of the various areas within and beyond the 16-km (10-mi) plume exposure pathway EPZ.

The staff's and FEMA's technical reviews of the ESPA addressed all of the relevant evaluation criteria in the 16 planning standards (i.e., A through P) of NUREG-0654 in a way consistent with NUREG-0800, Section 13.3, which cites the applicable regulations. The proposed new plant is to be located adjacent to the existing SGS/HCGS site. Therefore, for purposes of EP, little distinction exists between the SGS/HCGS site (for the existing reactor units) and the new plant at the PSEG Site. The ESPA takes advantage of the emergency planning resources, capabilities, and organization that currently exist at the SGS/HCGS site. NUREG-0800, Section 13.3, "Emergency Planning," Subsection I, "Areas of Review," provides, in part, this guidance to the staff regarding the appropriate level of review.

In general, if an application is for an additional reactor at an operating reactor site, and the application proposes to incorporate and extend elements of the existing emergency planning program to the new reactor (including by reference), those existing elements should be considered acceptable and adequate. The reviewer will generally focus the review on the extension of the existing program to the new reactor, and will determine whether the incorporated emergency planning program information from the existing reactor site (1) is applicable to the proposed reactor, (2) is up-to-date when the application is submitted, and (3) reflects use of the site for construction of a new reactor (or reactors) and appropriately incorporates the new reactor(s) into the existing plan.

To be consistent with this guidance, the staff focused its review on the extension of the existing SGS/HCGS site emergency preparedness program to the new unit(s), and considered those elements of the existing program that are unchanged in their applicability to the new unit(s), as acceptable and adequate.

13.3.4.1 Significant Impediments to the Development of Emergency Plans

As part of an ESPA review, 10 CFR 52.18 requires the NRC to determine, after consultation with FEMA, whether the information required of an ESP applicant by 10 CFR 52.17(b)(1) shows that there is no significant impediment to the development of emergency plans that cannot be mitigated or eliminated by measures proposed by the applicant. In a way consistent with 10 CFR 52.17(b)(1), NUREG-0654, Supplement 2, "Criteria for Emergency Planning in an Early Site Permit Application," addresses the identification of physical characteristics of the proposed site that could pose a significant impediment to the development of emergency plans.

NUREG-0654, Supplement 2, Section II states that an ESP application may identify unique physical characteristics of the site by performing a preliminary analysis of the time required to evacuate various sectors and distances within the 16-km (10-mi) EPZ for transient and permanent populations, noting major impediments to the evacuation or the taking of other protective actions. In addition, NUREG-0800, Section 13.3, Subsection II, "Acceptance Criteria," states this in Criterion 16 under "SRP Acceptance Criteria".

For an ESP application, a preliminary analysis of evacuation times is one example of how some significant impediments to the development of emergency plans may be identified. Other factors, such as the availability of adequate shelter facilities, in consideration of local building practices and land use (e.g., outdoor recreation facilities, including camps, beaches, hunting or fishing areas), and the presence of large institutional or other special needs populations (e.g., schools, hospitals, nursing homes, prisons) should also be addressed when identifying significant impediments to the development of emergency plans. Any ETE analysis or other identification of physical impediments should include the latest population census numbers and reflect the most recent local conditions. Appendix 4 to NUREG-0654/FEMA-REP-1, Rev. 1, and Supplement 2 to NUREG-0654/FEMA-REP-1, Rev. 1, provide guidance relating to performing an ETE analysis. NUREG/CR-6863 provides additional information on ETEs.

NUREG-0654, Supplement 2 further states that the ETE analysis is an emergency planning tool that can be used to assess the feasibility of developing emergency plans for a site, and will serve to demonstrate whether any physical characteristics (or combination of physical characteristics) of the site could pose impediments to the development of emergency plans. The staff notes that the value of the ETE analysis is in the methodology required to perform the analysis, rather than in the calculated ETE times. While lower ETEs might reflect favorable site characteristics from an emergency planning standpoint, there is no minimum required evacuation time that a licensee or an applicant has to meet. Accordingly, the ETE analysis should not focus on the numerical time estimates, but on the site factors that are considered to be impediments to emergency planning and preparedness.

In SSAR Section 13.3.1, the applicant described the population of the PSEG Site and the surrounding area, stating that the PSEG Site lies on the low coastal plain of New Jersey, surrounded by extensive marshlands and meadowlands, that the closest primary public road is NJ Highway 49 and that vehicle access to the site is from Alloway Creek Neck Road. The existing 734 acres of PSEG property (i.e., the SGS/HCGS site) is located on the southern part of Artificial Island on the east bank of the Delaware River in Lower Alloways Creek Township, Salem County, NJ.

The applicant further stated that there are no physical characteristics unique to the PSEG Site, that pose a significant impediment to the development of the emergency plan, and that the ETE Report did not identify any impediments to the development of the emergency plan. More specifically, the ETE models the road network surrounding the PSEG Site, and shows it to be robust enough to handle the volume of traffic in the event of an emergency. (Section 13.3.4.3.17 of this report provides a detailed evaluation of the ETE Report.)

The staff reviewed the projected populations within the 16-km (10-mile) EPZ for the 20-year period of the ESP, focusing on the period between the years 2010 and 2031. SSAR

Section 2.1.3, "Population Distribution," provides population projections for the area surrounding the PSEG Site through 2081. SSAR Tables 2.1-1 and 2.1-4 indicate the total projected resident and transient populations for 2010 to be 42,743 and 12,549, respectively, with a total of 55,292. The respective populations for 2031 are 47,772 and 14,057, with a total of 61,829. The staff calculated that this indicates an increase of 6537 over a 21-year period (i.e., 2010 to 2031), which is approximately 0.57 percent per year over that time period.

In addition, SSAR Section 2.2.2.9, "Projections of Industrial Growth," states that for Salem County, NJ, the Salem County Utilities Authority identified areas of the county that are expected to undergo economic development, including a possible recycling center in the City of Salem, NJ, and a business/industrial park addition in Oldmans Township and Carneys Point, NJ. The projects identified in Salem County are more than 8 km (5 mi) from the PSEG Site. For New Castle County, DE, most of the land is expected to remain agricultural or open space. The closest zoned industrial plot is the Delaware City Industrial Complex, located on the northwest side of Delaware City, 14.3 km (8.9 mi) from the PSEG Site. A new wastewater treatment plant is planned at 9.5 km (5.9 mi) west of the site, situated along U.S. Route 13. The planned wastewater treatment plant chemical delivery is not expected to approach any closer than the existing facilities in New Castle County. Finally, a review of available Salem and New Castle County planning documents did not indicate any significant expansion of military or transportation facilities located within 8 km (5 mi) of the PSEG Site.

The staff also considered FEMA's review of the offsite emergency plans, which did not identify any significant impediments to the development of emergency plans in support of a new plant at the PSEG Site. The staff finds that there is little distinction between the existing SGS/HCGS site Emergency Plan and the ESP Plan, and that the applicant has shown through use of the ETE, including consideration of other factors that currently support the existing SGS/HCGS site emergency plan, that there are no physical characteristics unique to the PSEG Site that could pose a significant impediment to the development of emergency plans.

Conclusion

The staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Supplement 2 and NUREG-0800. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 52.17(b)(1) and 10 CFR 52.18, insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situation.

13.3.4.2 Contacts and Arrangements with Local, State, and Federal Agencies

As part of the ESPA, PSEG submitted complete and integrated emergency plans pursuant to 10 CFR 52.17(b)(2)(ii). As such, 10 CFR 52.17(b)(4) requires, in part, that the applicant make good-faith efforts to obtain certifications from local, State, and Federal governmental agencies with emergency planning responsibilities that (1) the proposed emergency plans are practicable; (2) the agencies are committed to participating in any further development of the plans, including any required field demonstrations; and (3) the agencies are committed to executing their responsibilities under the plans in the event of an emergency. This requirement is also reflected in NUREG-0654, Supplement 2, Section IV.B, and NUREG-0800, Section 13.3, Subsection II.

In addition, NUREG-0654, Supplement 2, Section II.B states that the ESP application must include a description of contacts and arrangements made with local, State, and Federal

agencies with emergency planning responsibilities. The descriptions should include the name and location of the organization contacted, the title and/or position of the person(s) contacted, and the role of the organization in EP. NUREG-0800, Section 13.3, Subsection II also addresses this requirement.

The contacts and arrangements with local, State, and Federal agencies, as well as other offsite support organizations, are addressed throughout the ESP Plan, and discussed in Section 13.3.4.3 of this report. In SSAR Section 13.3.5, "Contacts and Agreements," the applicant stated that the surrounding emergency response organizations currently support SGS and HCGS, and that the addition of a new facility does not change the number of organizations or their level of support. In ESP Plan Attachment 2, "Certification Letters," the applicant provided certification letters (dated between December 2009 and January 2010) from these offsite agencies in support of the new plant.

- New Jersey Office of Emergency Management
- Salem County Department of Emergency Services
- Cumberland County Office of Emergency Management
- Lower Alloways Creek Township Emergency Management
- Delaware Emergency Management Agency
- New Castle County Office of Emergency Management
- Kent County Emergency Management

In addition, in ESP Plan Attachment 3, "Memoranda of Understanding," the applicant provided current memoranda of understanding with offsite support organizations that support SGS and HCGS. The applicant also stated that as PSEG moves forward with new plant development, the memoranda of understanding will be revised, as necessary, to include information to support the new plant, and the certification letters will be deleted. Pursuant to 10 CFR 52.39(b), an applicant for a COL that references this ESP shall update the emergency preparedness information that was provided under 10 CFR 52.17(b), and discuss whether the updated information materially changes the bases for compliance with applicable NRC requirements. As such, the staff identified the following COL action item to address necessary revisions of the agreements with offsite support organizations:

COL Action Item 13.3-1

An applicant for a COL or CP referencing this early site permit should submit to the NRC updated letters of agreement or memoranda of understanding with offsite support organizations to reflect the chosen plant design.

The staff reviewed the certification letters and memoranda of understanding, including the FEMA findings related to the memoranda of understanding (letters of agreement) in ESP Plan Attachment 3. The staff finds that the certification letters are acceptable because they address the three criteria identified above from 10 CFR 52.17(b)(4) and NUREG-0654, Supplement 2, Section IV.B, and are consistent with NUREG-0800, Section 13.3, Subsection II. In addition, the memoranda of understanding are acceptable because they address the criteria in NUREG-0654, Supplement 2, Section II.B (i.e., they include the names and locations of the organizations contacted, the titles and/or positions of the persons contacted, and the roles of the organizations in emergency planning), and are consistent with NUREG-0800, Section 13.3, Subsection II.

Conclusion

The staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Supplement 2, and NUREG-0800. A COL applicant will address COL Action Item 13.3-1. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 52.17(b)(4), insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations.

13.3.4.3 Complete and Integrated Emergency Plan

In SSAR Section 13.3, the applicant stated that the ESPA Part 5 contains the complete and integrated emergency plan (i.e., the ESP Plan), which is based on the existing SGS and HCGS Emergency Plan, and complies with 10 CFR 50.47(b) and 10 CFR Part 50, Appendix E. In addition, SSAR Section 13.3.3, "Emergency Planning Zones," states that the EPZs for the new plant at the PSEG Site are based on the requirements contained in Appendix E. As shown in ESP Plan Figure 1-3, the plume exposure pathway EPZ for the PSEG Site is an area surrounding the plant within a radius of approximately 16 km (10 miles), and includes portions of Salem and Cumberland Counties in New Jersey and New Castle and Kent Counties in Delaware. ESP Plan Figure 1-4 shows the ingestion exposure pathway EPZ, which is an area surrounding the PSEG Site within a radius of approximately 80 km (50 mi). The existing 16-km and 80-km (10-mi and 50-mi) EPZs for the SGS and HCGS are used for the new plant.

Sections 13.3.4.3.1 through 13.3.4.3.17 describe the staff's technical evaluation of the information provided in the ESP Plan, and the review and findings in this SER apply only to the proposed new plant. Any changes to the operating SGS and HCGS units Emergency Plan would be addressed as separate licensing actions, in accordance with 10 CFR 50.54(q). The section designations of the ESP Plan generally correspond to the planning standard designations in NUREG-0654, Section II; specifically, ESP Plan Sections 2 through 17 addresses NUREG-0654, Planning Standards A through P, respectively. The format of the staff's review of the ESP Plan is patterned after these 16 planning standards, which reflect the requirements in 10 CFR 50.47(b)(1) through 10 CFR 50.47(b)(16). 10 CFR Part 50, Appendix E provides additional requirements that duplicate and supplement the evaluation criteria associated with the planning standards. The staff's evaluation of the various aspects of 10 CFR Part 50, Appendix E is included within the associated NUREG-0654 planning standards review.

13.3.4.3.1 Assignment of Responsibility (Organization Control)

As stated in NUREG-0654, Planning Standard A, "Assignment of Responsibility (Organization Control)," 10 CFR 50.47(b)(1) requires that primary responsibilities for emergency response by the nuclear facility licensee and by State and local organizations within the EPZs have been assigned, the emergency responsibilities of the various supporting organizations have been specifically established, and each principal response organization has staff to respond and to augment its initial response on a continuous basis. In addition, 10 CFR Part 50, Appendix E, Section III requires that the emergency plans incorporate information about the emergency response roles of supporting organizations and offsite agencies, and that the incorporated information shall be sufficient to provide assurance of coordination among the supporting groups and with the licensee. 10 CFR Part 50, Appendix E, Section IV.A requires a description of the local offsite services to be provided in support of the licensee's emergency organization; identification of, and a description of the assistance expected from, appropriate local, State, and Federal agencies with responsibilities for coping with emergencies, including

hostile action at the site; and identification of the State and/or local officials responsible for planning for, ordering, and controlling appropriate protective actions, including evacuations when necessary.

In ESP Plan Section 2, "Assignment of Responsibility," the applicant described the responsibilities of the applicant and various local, State, and Federal agencies, as well as private sector organizations, that are part of the emergency response organization (ERO) for the PSEG Site and might be needed to respond to an emergency at the PSEG Site. The staff reviewed this section, as well as other relevant portions of the application, to determine whether the application conforms to the applicable guidance and complies with the pertinent regulatory requirements. The staff's primary focus was to evaluate the emergency plan against NUREG-0654, planning standard A, which provides the detailed evaluation criteria that the staff should consider to determine whether the emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(1).

ESP Plan Section 2.2.0, "Principal Government Jurisdictions in the EPZs," describes the local and State response organizations that are intended to be part of the overall response organization for the EPZs. The interrelationships of PSEG and offsite organizations are illustrated in block diagrams in ESP Plan Figures 2-1 through 2-11 and 3-1 through 3-4. In addition, Federal agencies are discussed in ESP Plan Section 4 (see Section 13.3.4.3.3 of this report regarding emergency response support and resources).

The local response organizations include the Delaware Emergency Management Agency (DEMA), which serves as the lead agency for coordinating State emergency actions and implements the Delaware Radiological Emergency Preparedness (REP) Plan. As described in the Delaware REP Plan, the Delaware Department of Health and Social Services (DHSS) has the overall responsibility for protecting the health and safety of the general public. In addition, the Delaware Department of Natural Resources and Environmental Control (DNREC) is responsible for protecting the environment, and the Delaware Department of Agriculture (DDA) is responsible for protection of agriculture. The Technical Assessment Center (TAC) develops Delaware's accident assessment and protective action response and provides protective action recommendations to the DEMA Director. ESP Plan Figure 2-6 shows the Delaware response organization, and ESP Plan Figure 2-5 shows the outline of the development of protective actions (discussed in detail in ESP Plan Sections 10 and 11).

The resources and response organizations of the State of New Jersey are described in the New Jersey REP Plan. The Office of Emergency Management (OEM) of the New Jersey State Police (NJSP) has the authority to assist in supervising and coordinating State emergency response activities, including those of all of the political subdivisions. The Superintendent of the NJSP acts as the State emergency coordinator and is responsible for directing and coordinating all emergency response by State agencies. The New Jersey Department of Environmental Protection (DEP) is the lead agency for New Jersey's assessment of radiological emergencies, and has the authority to recommend and take radiological protective actions. The DEP Commissioner is the agency head responsible for the response of that organization, and actions taken by DEP are coordinated through (and parallel with) the actions of the NJSP. ESP Plan Figure 2-7 shows the New Jersey response organization.

Local response organizations include Salem and Cumberland Counties in New Jersey and New Castle and Kent Counties in Delaware. The local government representatives who act as the county emergency coordinators are the County Emergency Management Coordinators for

Salem and Cumberland Counties and the County Emergency Preparedness Coordinators for New Castle and Kent Counties. The response organizations for the counties are shown in ESP Plan Figures 2-8 through 2-11. Expected assistance associated with hostile action at the site is addressed in Section 13.3.4.3.3 of this report.

The States of Pennsylvania and Maryland are contiguous (ingestion pathway) states, and are shown in ESP Plan Figure 1-4, "50-Mile Emergency Planning Zone." The State of New Jersey has a Memorandum of Understanding with Pennsylvania and Maryland, and has the primary responsibility for notification and communications with these contiguous states. The State of Delaware also has agreements with Pennsylvania and Maryland regarding notifications. If an accident causes conditions offsite that justify monitoring of the ingestion pathway, PSEG's Emergency Coordinator will verify with the State of New Jersey that Pennsylvania and Maryland have been notified. The criterion for recommending ingestion pathway monitoring is that radionuclide concentrations in excess of 10 CFR Part 20, Appendix B limits could potentially exist or are verified to exist offsite.

ESP Plan Section 2.1.1, "Internal Responsibility," states that PSEG has the primary responsibility for planning and implementing emergency measures within the site boundary. In addition to accident mitigation, this responsibility includes accident assessment and the evaluation of any real or potential risk to the public health and safety. Based on this evaluation, appropriate offsite agencies are promptly notified of the protective action recommendations (PARs) for the affected population areas. Additional information about the emergency response organization and resources is provided in ESP Plan Sections 3 and 4. ESP Plan Section 3.4.0, "Emergency Direction and Control," states that the Emergency Coordinator has overall responsibility to direct and control the emergency response. (Emergency Coordinator responsibilities are also addressed in ESP Plan Sections 3, 4, and 14, and discussed in Sections 13.3.4.3.2, 13.3.4.3.3, and 13.3.4.3.13, respectively, of this report.)

The ESP Plan states that the PSEG Site maintains 24-hour emergency response capability. The normal on-shift complement provides the initial response to an emergency, and is trained to handle emergency situations until the augmented ERO arrives. Procedures for training and maintenance of the emergency organization are in place to provide the capability of continuous (24-hour) operations. ESP Plan Section 7, "Emergency Communications," describes the communications plans for emergencies, and states that provisions are in place on a 24-hour basis for communications with the States of New Jersey and Delaware, counties, and the NRC. The Emergency Manager/Supervisor is responsible for maintaining and ensuring the continuity of personnel and resources. ITAAC 8.1.1.C.3 states that the licensee will demonstrate the ability to prepare for 24-hour staffing requirements during a full participation exercise.

ESP Plan Section 2.1.2, "External Agreements," states that PSEG has entered into agreements with emergency response organizations that would provide onsite and offsite support in the event of an emergency at the PSEG Site. These agreements are provided in the ESP Plan Attachments 2 and 3, and are described in Section 13.3.4.2 of this report. The ESP Plan Attachment 3 includes copies of 16 memoranda of understanding/letters of agreement from various agencies and organizations that currently provide support during response to an emergency at the SGS/HCGS site, which describe the scope of services to be provided. The staff reviewed the memoranda of understanding, and confirmed that they adequately identify the emergency response measures to be provided, the mutually acceptable criteria for implementation, and the arrangements for exchange of information. PSEG identified two additional memoranda of understanding with AREVA and Mitsubishi (not included in ESP

Plan Attachment 3) that will be revised, as necessary, to include information to support the proposed new plant. (Also see COL Action Item 13.3-1 in Section 13.3.4.2 of this report.)

In its Interim Finding Report for Reasonable Assurance, FEMA found that the offsite emergency plans are adequate for this planning standard and the associated evaluation criteria in NUREG-0654.

The staff finds that the applicant has adequately assigned primary responsibilities for emergency response, and the applicant has the staff to respond to and to augment its initial response on a continuous basis. The applicant is capable of providing 24-hour-per-day emergency response and staffing of communications links, including continuous (24-hour) operations for a protracted period. In addition, the applicant has identified the appropriate organizations that are intended to be part of the overall response organization, and has established the emergency responsibilities of the various supporting organizations, including providing adequate written agreements. The applicant has specified the concept of operations and its relationship to the total effort, illustrated the interrelationships in a block diagram, and has identified the individuals in charge of the emergency response and for ensuring continuity of resources.

In addition, the staff finds that the applicant has incorporated information about the emergency response roles of supporting organizations and offsite agencies, and that that information is sufficient to provide assurance of coordination among the supporting groups and with the licensee. Further, the applicant has described the local offsite services to be provided in support of the licensee's emergency organization, and has identified the assistance expected from appropriate local, State, and Federal agencies, including State and/or local officials responsible for planning for, ordering, and controlling appropriate protective actions.

Conclusion

The staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Planning Standard A. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(1) and 10 CFR Part 50, Appendix E, Sections III and IV.A, insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations

13.3.4.3.2 Onsite Emergency Organization

As stated in NUREG-0654, Planning Standard B, "Onsite Emergency Organization," 10 CFR 50.47(b)(2) requires that on-shift facility licensee responsibilities for emergency response are unambiguously defined, that adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, that timely augmentation of response capabilities is available, and that interfaces among various onsite response activities and offsite support and response activities are specified. In addition, 10 CFR Part 50, Appendix E, Section IV.A requires a description of the organization for coping with radiological emergencies, including definition of authorities, responsibilities, and duties of individuals assigned to the licensee's emergency organization, and the means for notification of such individuals in the event of an emergency. This shall include a description of the normal plant operating organization, onsite emergency response organization, headquarters personnel who will augment the onsite emergency organization, and local offsite services to be provided in support of the licensee's emergency organization. The emergency plan shall identify persons within the licensee organization who will be responsible for making offsite dose projections, and other

employees with special qualifications for coping with emergency conditions that might arise. Other persons with special qualifications, who are not licensee employees and who may be called on for assistance, shall also be identified, including a description of their special qualifications. 10 CFR Part 50, Appendix E, Section IV.A.9 requires a detailed analysis demonstrating that on-shift personnel assigned emergency plan implementation functions are not assigned responsibilities that would prevent the timely performance of their assigned functions, as specified in the emergency plan.

In ESP Plan Section 3, "Emergency Organization," the applicant described the ERO and its key positions and associated responsibilities, including outlining the staffing requirements that provide initial emergency response actions and provisions for timely augmentation of on-shift personnel when required. The staff reviewed this section, as well as other relevant portions of the application, to determine whether the application conforms to the applicable guidance and complies with the pertinent regulatory requirements. The staff's primary focus was to evaluate the emergency plan against NUREG-0654, Planning Standard B, and NSIR/DPR-ISG-01, Section IV.C, which provide the detailed evaluation criteria that the staff should consider to determine whether the emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(2).

ESP Plan Section 3.2.0, "Normal Shift Organization," describes the plant's normal staff complement that comprises the onsite emergency organization, including various positions and station departments (e.g., operations, fire department and first aid team, maintenance, engineering, security, radiation protection, and chemistry). The emergency organization's functional areas and detailed job descriptions are provided in ESP Plan Section 3.9. ESP Plan Figures 3-1 and 3-2 illustrate in block diagrams the relationship of the onsite ERO to the normal staff complement, as well as interfaces between the Control Room and Technical Support Center (TSC) with offsite agencies and organizations. In addition, ESP Plan Figures 3-3 and 3-4 illustrate the Emergency Operations Facility (EOF) and Emergency News Center/Joint Information Center (ENC/JIC) organizational structure and interfaces, respectively, as well as interfaces with external agencies and organizations.

The individual functioning in the position of Emergency Coordinator has overall responsibility to direct and control the emergency response. The Shift Manager initially assumes the Emergency Coordinator function and is responsible for initiating the necessary immediate actions to limit the consequences of an accident and bring the affected unit under control. The Shift Manager is normally the senior shift member of the station organization, and has the primary management responsibility for safe operation, including maintaining an overview of the unit's condition, providing emergency direction and control, initiating emergency actions, and controlling operations by providing specific directions to shift personnel. While the Shift Manager is fulfilling the Emergency Coordinator function, the Control Room Supervisor takes operational control of the unit and has the authority and responsibility of the Shift Manager.

As the onsite emergency organization is augmented, the Emergency Coordinator function passes from the Shift Manager to the Emergency Duty Officer, and then to the Emergency Response Manager. ESP Plan Table 3-1 describes the respective duty positions and identifies at which emergency classification these positions may assume the Emergency Coordinator duties. The individual fulfilling the function of Emergency Coordinator has these non-delegable responsibilities:

- Provide direction, control, and coordination of PSEG's emergency response

- Authorize the expenditure of company funds and commit corporate resources as necessary to implement emergency procedures and/or to mitigate the accident
- Classify emergencies in accordance with the PSEG Site Event Classification Guides
- Make decisions to notify and recommend protective actions to offsite agencies

(Emergency Coordinator responsibilities are also addressed in ESP Plan Sections 2, 4, and 14, and discussed in Sections 13.3.4.3.1, 13.3.4.3.3, and 13.3.4.3.13, respectively, of this report.) Upon determination by the Shift Manager of an emergency classified as an Alert or higher, the Operations Support Center (OSC) is activated. For short-term staff augmentation, the OSC Coordinator takes control of the corrective action and support function from the Shift Manager, and is the interface between the Shift Manager and OSC support teams. The OSC Coordinator assumes responsibility for directing support of repair, corrective actions, fire fighting, search and rescue teams, and is responsible for supplementing the OSC staff as needed. Long-term staff augmentation includes necessary additional support staff, including contractual assistance.

The staff finds that the applicant has adequately designated an individual as the Emergency Coordinator who has the authority and responsibility to initiate emergency actions, including recommending protective actions to the authorities responsible for implementing offsite emergency measures. The staff also finds that the applicant clearly specified which responsibilities may not be delegated to other elements of the emergency organization, and has identified an adequate line of succession for the Emergency Coordinator position.

In ESP Plan Section 3.10, "Staffing Commitments," the applicant stated that the commitment for minimum staffing will be in accordance with NUREG-0654, Table B-1, "Minimum Staffing Requirements for NRC Licensees for Nuclear Power Plant Emergencies." Specifically, ESP Plan Table 3-2 provides a correlation between major functional areas, major tasks, and position title or expertise (as described in NUREG-0654, Table B-1) and the similar tasks and titles in the ERO. The staff reviewed ESP Plan Table 3-2, and finds that the required minimum on-shift and augmentation staffing in support of the new plant is acceptable because it is consistent with NUREG-0654, Table B-1.

Fukushima Dai-ichi – NTTF Recommendation 9.3

In RAI 65, Question 13.03-29, the staff requested that the applicant address staffing and communications provisions to enhance emergency preparedness, as addressed in NRC Near-Term Task Force (NTTF), Recommendation 9.3, "Emergency Preparedness" review of the accident at the Fukushima Dai-ichi nuclear facility (also discussed in "Recommendations for Enhancing Reactor Safety in the 21st Century", July 12, 2011, and the NRC's subsequent letter to licensees, "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," March 12, 2012). With regard to staffing, the accident at Fukushima highlighted the need to determine and implement the required staff to fill all necessary positions responding to a multi-unit event. Specifically, NTTF Recommendation 9.3 requests that all power reactor licensees and holders of construction permits (in active or deferred status) assess their current staffing levels and determine the appropriate staff to fill all necessary positions for responding to a multi-unit event during a beyond-design-basis natural event, and determine if any enhancements are appropriate. Single-unit sites should provide the requested information, as it pertains to an extended loss of

all alternating current (ac) power and impeded access to the site. (Emergency communications are addressed in Section 13.3.4.3.6 of this report.)

In a September 10, 2012, response to RAI 65, Question 13.03-29, the applicant included the statement below, which addresses both the staffing and communications areas addressed in NTTF Recommendation 9.3.

The detailed designs of on-site and off-site communication systems, including their power supplies, are not yet complete. The designs will be completed after the selection of the reactor technology. After PSEG selects a reactor technology, an assessment of on-site and off-site communication systems and equipment used during an emergency, including their power supplies and the emergency organization staffing levels, will be conducted to identify possible enhancements to ensure communications are maintained during a large scale natural event as requested in *Recommendation 9.3* . . .

Consistent with the applicant's stated intention, the staff identified the following permit conditions, which address enhanced staffing and communications capabilities. The permit conditions include the use of Nuclear Energy Institute (NEI) technical report NEI 12-01, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities," which the NRC has endorsed as an acceptable method for licensees to employ when addressing NTTF Recommendation 9.3.¹

Permit Conditions 5 and 6

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.
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

¹ See (1) NRC May 15, 2012, letter, 'U.S. Nuclear Regulatory Commission Review of NEI 12-01, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities," Revision 0, dated May 2012' (ADAMS Accession No. ML12131A043); (2) NEI May 3, 2012, letter, 'Transmittal of NEI 12-01, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities," Revision 0, dated May 2012' (ADAMS Accession No. ML12125A411); and (3) NEI Report No. 12-01, Revision 0, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities," May 2012 (ADAMS Accession No. ML12125A412).

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.

Subject to Permit Conditions 5 and 6, the staff finds the applicant's response to RAI 65, Question 13.03-29, acceptable. Accordingly, the staff considers RAI 65, Question 13.03-29, resolved.

Enhancements to Emergency Preparedness Regulations

In addition to appropriate staffing levels associated with multi-unit events (discussed above), on November 23, 2011, the NRC published a Final Rule, "Enhancements to Emergency Preparedness Regulations," (76 FR 72560) (hereinafter referred to as "Final Rule"), which included a new requirement in 10 CFR Part 50, Appendix E, Section IV.A associated with on-shift ERO personnel. Specifically, 10 CFR Part 50, Appendix E, Section IV.A.9 requires that for nuclear power reactor licensees, by December 24, 2012, a detailed analysis demonstrating that on-shift personnel assigned emergency plan implementation functions are not assigned responsibilities that would prevent the timely performance of their assigned functions, as specified in the emergency plan.

In an August 29, 2012, letter to the NRC, PSEG described the implementation approach for the 11 amendments (enhancements) to the emergency preparedness regulations addressed in the Final Rule (76 FR 72560). With regard to the on-shift staffing analysis requirement in 10 CFR Part 50, Appendix E, Section IV.A.9, at the COL application phase, PSEG will validate the existing on-shift staffing in the ESP Plan when a reactor technology selection has been made and plant procedures are available. PSEG will make a COL application commitment to perform the validation analysis in accordance with the requirements of the Final Rule and submit the results to the NRC 180 days prior to fuel load. In addition, validation will be performed using Nuclear Energy Institute (NEI) 10-05, "Assessment of On-Shift Emergency Response Organization Staffing and Capabilities," Revision 0, June 2011, which has been endorsed by the NRC as a process for performing the analysis.

The staff finds this approach acceptable because it is consistent with the Final Rule and Interim Staff Guidance NSIR/DPR-ISG-01. The NRC endorsement of NEI 10-05 is addressed 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 finds it an acceptable methodology for this purpose. Consistent with the applicant's stated intention, the staff identified the following permit condition, which addresses the actions that will be taken to analyze on-shift personnel assigned emergency plan implementation function.

Permit Condition 7

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.

Subject to Permit Conditions 5, 6, and 7, the staff finds that the applicant unambiguously defined its responsibilities for emergency response, has adequate staffing to provide and maintain at all times initial facility accident response in key functional areas, and is capable of timely augmentation of the response capabilities. In addition, the applicant adequately specified the interfaces among various onsite and offsite support and response activities. In addition, the applicant described the organization for coping with radiological emergencies, including the authorities, responsibilities, and duties of individuals assigned to the licensee's emergency organization and the means for their notification in the event of an emergency. The applicant also described the normal plant operating organization, the onsite ERO, and the headquarters and local offsite personnel and services that will augment and support the onsite organization. Further, licensee employees who are responsible for making offsite dose projections, and licensee and other persons with special qualifications for coping with emergency conditions, are also identified. An analysis of on-shift staffing personnel responsibilities is addressed in Permit Condition 7.

Conclusion

Subject to Permit Conditions 5, 6, and 7, the staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Planning Standard B and NSIR/DPR-ISG-01, Section IV.C. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(2) and 10 CFR Part 50, Appendix E, Section IV.A, insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations.

13.3.4.3.3 Emergency Response Support and Resources

As stated in NUREG-0654, Planning Standard C, "Emergency Response Support and Resources," 10 CFR 50.47(b)(3) requires that arrangements for requesting and effectively using assistance resources have been made, arrangements to accommodate State and local staff at the licensee EOF have been made, and other organizations capable of augmenting the planned response have been identified. In addition, 10 CFR Part 50, Appendix E, Section III requires that the emergency plans incorporate information about the emergency response roles of supporting organizations and offsite agencies, and that that information shall be sufficient to provide assurance of coordination among the supporting groups and with the licensee. 10 CFR Part 50, Appendix E, Section IV.A.7 requires identification of, and a description of the

assistance expected from, appropriate local, State, and Federal agencies with responsibilities for coping with emergencies, including hostile action at the site.

In ESP Plan Section 4, “Emergency Response Support and Resources,” the applicant described the provisions for requesting and effectively using support resources and for accommodating offsite officials at the emergency response facilities. The staff reviewed this section, as well as other relevant portions of the application, to determine whether the application conforms to the applicable guidance and complies with the pertinent regulatory requirements. The staff’s primary focus was to evaluate the emergency plan against NUREG-0654, Planning Standard C, which provides the detailed evaluation criteria that the staff should consider to determine whether the emergency plan meets the applicable regulatory requirement in 10 CFR 50.47(b)(3).

ESP Plan Section 4 describes the Federal emergency resource, including the roles of the NRC, FEMA, U.S. Department of Energy (DOE), and U.S. Coast Guard (USCG). The resources of the Federal Government—through the implementation of the National Response Framework (NRF), Nuclear/Radiological Incident Annex—may be used to supplement the onsite radiological surveys or relieve PSEG offsite radiological survey teams. The Emergency Coordinator is authorized to request NRF resources. (Emergency Coordinator responsibilities are also addressed in ESP Plan Sections 2, 3, and 14, and discussed in Sections 13.3.4.3.1, 13.3.4.3.2, and 13.3.4.3.13, respectively, of this report.) The Federal response (other than by the NRC) is primarily related to offsite protective actions and radiological assessment, and is implemented at the request of the States of New Jersey and/or Delaware. FEMA acts as coordinator of the Federal response, and emergency management from New Jersey and Delaware provides information and assistance to FEMA.

PSEG provides appropriate space and facilities to the principal State and Federal response organizations at the EOF, from where Federal response coordination will be conducted. ESP Plan Section 7 describes dedicated and commercial communication systems that are available to support the Federal response. PSEG also assigns a person to assist the States, which allows State response personnel to have immediate access to all station radiological and operational data. Upon request, PSEG will send representatives to the State emergency operations centers (EOCs) to provide assistance and coordination. ESP Plan Figure 4-1, “PSEG Site Access from Area Airports,” provides directions to the EOF and PSEG Site from Dulles International Airport, Philadelphia International Airport, and New Castle County Airport.

The applicant also identified radiological laboratories that can provide radiological monitoring and analysis services in an emergency. These include the PSEG Maplewood Testing Services in Maplewood, NJ, which provides extensive facilities and equipment for analysis of materials, environmental radioactivity analysis, and radiation surveys. In addition, manpower is available to assist in sample collection in the aftermath of an incident involving the release of radioactive materials. Other organizations that can be relied on in an emergency, including the identification of specific assistance, are identified in memoranda of understanding in ESP Plan Attachment 3. These include General Electric Company, Institute of Nuclear Power Operations (INPO), Westinghouse Electric Company, Haz/Med Consultants, Wilmington Fire Department, AREVA, Mitsubishi, and the Memorial Hospital of Salem County. ESP Plan Figures 2-3 through 2-11 and 3-1 through 3-3 illustrate the interrelationships of the offsite agencies and organizations with the overall emergency response organization.

In an August 29, 2012, letter, PSEG described the implementation approach for the 11 amendments (enhancements) to the emergency preparedness regulations addressed in the Final Rule. With regard to assistance expected from offsite response organizations (OROs) during emergencies including a hostile-action-based (HAB) event, the applicant stated that additional detail of ORO response capabilities and resources for a HAB event is maintained by PSEG Nuclear and may contain Safeguards Information. These same resources would be available to the new unit(s) at the PSEG Site during a HAB event, as stated in the certification letters (in ESP Plan Attachment 2). In addition, the PSEG Site emergency plan implementing procedures (EPIPs) will identify the ORO resources available and their integration into site activities during an emergency event at the PSEG Site (see ITAAC 9.1).

In its Interim Finding Report for Reasonable Assurance, FEMA found that the offsite emergency plans are adequate for this planning standard and the associated evaluation criteria in NUREG-0654.

The staff finds that the applicant has made arrangements for requesting and effectively using assistance resources, including arrangements to accommodate State and local staff at the EOF, and has identified other organizations capable of augmenting the planned response. In addition, the applicant has made adequate provisions for incorporating the Federal response capability into its operation plan, and has identified radiological laboratories and other organizations that can be relied on in an emergency to provide assistance. The staff also finds that the emergency plans incorporate information about the emergency response roles of supporting organizations and offsite agencies, and that the information is sufficient to provide assurance of coordination among the supporting groups and the licensee. Finally, the applicant has identified appropriate local, State, and Federal agencies with responsibilities for coping with emergencies (including hostile action at the PSEG Site), as well as the expected assistance from each.

Conclusion

The staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Planning Standard C. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(3) and 10 CFR Part 50, Appendix E, Sections III and IV.A.7, insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations.

13.3.4.3.4 Emergency Classification System

As stated in NUREG-0654, Planning Standard D, "Emergency Classification System," 10 CFR 50.47(b)(4) requires that a standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee, and that State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures. In addition, 10 CFR Part 50, Appendix E, Section IV.B requires a description of the means to be used for determining the magnitude, and for continually assessing the impact, of the release of radioactive materials, including emergency action levels (EALs) that are to be used as criteria for determining the need for offsite agency notifications and participation, and when and what types of protective measures should be considered. The EALs must include hostile actions that might adversely affect the nuclear power plant. The initial EALs shall be discussed and agreed on by the applicant or licensee and State and local governmental authorities, and approved by the NRC. Thereafter, EALs shall be reviewed with State and local governmental authorities on

an annual basis. 10 CFR Part 50, Appendix E, Section IV.C requires a description of EALs and emergency conditions that involve alerting or activating the total emergency organization, including communication steps to be taken under each emergency class. The emergency classes defined shall include (1) notification of unusual event, (2) alert, (3) site area emergency, and (4) general emergency. 10 CFR Part 50, Appendix E, Section IV.C.2 requires the capability to assess, classify, and declare an emergency condition within 15 minutes after the availability of indications to plant operators that an EAL has been exceeded, and to promptly declare the emergency conditions as soon as possible after the identification of the appropriate emergency classification level.

In ESP Plan Section 5, "Emergency Classification System," the applicant described the emergency classification and action level scheme used to determine the minimum response to an abnormal event at the plant. The staff reviewed this section, as well as other relevant portions of the application, to determine whether the application conforms to the applicable guidance and complies with the pertinent regulatory requirements. The staff's primary focus was to evaluate the emergency plan against NUREG-0654, Planning Standard D, which provides detailed evaluation criteria that the staff should consider to determine whether the emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(4).

In ESP Plan Attachment 5, "Emergency Action Levels," the applicant addressed the EAL scheme associated with the four proposed reactor technologies, consisting of the U.S. EPR, ABWR, US-APWR, and AP1000. The applicant stated that certain aspects of each reactor design's EALs cannot be completed at this time because actual setpoints cannot be derived until as-built information is available and certain technical specifications are finalized. PSEG's adoption of an EAL scheme following the selection of a reactor technology is also discussed in SSAR Section 13.3.

At the ESP application stage (with a proposed complete and integrated emergency plan), as well as the COL application stage, the requisite EAL information is limited and consists of four critical elements: (1) An overview of the EAL scheme, including a definition of the four emergency classification levels and general list of licensee actions; (2) a commitment to develop the remainder of the EAL scheme using a specified NRC-endorsed guidance document; (3) a proposed license condition that addresses EAL completion, agreement with State and local officials (as appropriate), and submission of the fully developed EALs to the NRC; and (4) maintaining the EALs in a document controlled by 10 CFR 50.54(q). The information associated with these critical elements, along with the permit conditions, provides a sufficient level of application detail to support the staff's reasonable assurance evaluation.

ESP Plan Section 5 provides an overview of the emergency action level scheme, including the definition of the four emergency classification levels (i.e., Unusual Event, Alert, Site Area Emergency, and General Emergency) and a general list of licensee actions for each emergency classification level. The staff finds this acceptable because it is consistent with 10 CFR Part 50, Appendix E, Section IV.C. In addition, the applicant stated that the emergency classification system is designed to provide a consistent method for categorizing possible events or accidents, and that a detailed description of the emergency classifications is provided in the Event Classification Guide (ECG).

The ECG lists the initiating conditions and associated action levels for all emergency and non-emergency reportable events (e.g., reportable action levels for Security/Emergency Response Capabilities), and guides the Emergency Coordinator to an immediate and

appropriate response specific to the event. (Security-based EALs are also discussed in NRC Bulletin 2005-02, "Emergency Preparedness and Response Actions for Security-Based Events," July 18, 2005, and in Section 13.3.4.3.10 of this report.) ESP Plan Attachment 1-1.3 provides the typical contents (example index) of an ECG for the PSEG Site. The ECG is considered an annex of the PSEG emergency plan, and like the emergency plan is subject to specific reviews and approvals. The staff finds this acceptable because the EALs are kept in a document that is controlled by 10 CFR 50.54(q). In addition, ESP Plan Section 17 states that the emergency plan and associated documents (including EALs) are reviewed by PSEG at least once each year. As part of the review, the ECG is reviewed with the State and local governments.

In an August 29, 2012, letter, PSEG described the implementation approach for the 11 amendments (enhancements) to the emergency preparedness regulations addressed in the Final Rule. With regard to the requirement in 10 CFR Part 50, Appendix E, Section IV.C.2 for the capability to assess, classify, and declare an emergency condition within 15 minutes after the availability of indications to plant operators that an EAL has been exceeded, the applicant stated that PSEG will implement this element of the Final Rule in the ECG, as is done in the current SGS and HCGS ECGs. Permit Conditions 8 and 9 (below) address submission of the (ECG) EALs. In addition, the requirement to make an emergency declaration within 15 minutes of the existence of the condition will be included in the EPIPs (see ITAAC 9.1). See ITAAC 8.1.1.A.1.a, which addresses accident assessment and classification (within 15 minutes) during a full-participation exercise.

In ESP Plan Attachment 5, the applicant stated that in the COL application, PSEG will make a commitment to adopt its EAL scheme by utilizing the guidance in the NRC-approved (template) version of either NEI 99-01, or NEI 07-01, as appropriate, at least 180 days prior to initial fuel load of the unit, and that any deviations or differences in the proposed EALs from the applicable template will be justified. In addition, the applicant stated that the development of EALs in accordance with the guidance presented in NEI 99-01 or NEI 07-01, including its submittal to the NRC at least 180 days prior to fuel load, is a proposed license condition. ESP Plan Section 5 further states that the EALs have been discussed and agreed on by PSEG and the State governments. Consistent with the applicant's stated intention, the staff identified the following permit conditions, which address the creation of a fully developed EAL scheme, interfaces with State and local officials, and submission to the NRC.

Permit Conditions 8 and 9

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).

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).

For the reasons discussed above, the staff finds that the applicant adequately addressed the four critical elements (identified above) that comprise the required EAL information in the ESP application. EALs are also addressed in the various ITAAC in ESP Plan Attachment 10 and reflected in Table 13.3-1 of this report. These include ITAAC 1.1(a), which states that the parameters referenced in the Emergency Classification and EAL scheme are retrievable in the Control Room, TSC, and EOF. ITAAC 1.1(b) states that the ranges of the displays encompass the values specified in the Emergency Classification and EAL scheme. Finally, full-participation exercise ITAAC 8.1.1.A states that the licensee will demonstrate the ability to identify initiating conditions, determine EAL parameters, and correctly classify the emergency throughout the exercise.

In its Interim Finding Report for Reasonable Assurance, FEMA found that the offsite emergency plans are adequate for this planning standard and the associated evaluation criteria in NUREG-0654.

Subject to Permit Conditions 8 and 9, the staff finds that the applicant established a standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, which includes the four emergency classes identified above. The applicant described EALs and emergency conditions that involve ERO activation, including steps to be taken under each emergency class. The applicant also described the means to determine the magnitude of, and for continually assessing the impact of, the release of radioactive materials, and EALs (including those pertaining to hostile actions) that are used to determine the need for offsite notifications and protective measures. In addition, the applicant has the capability to assess, classify, and declare an emergency condition within 15 minutes after the availability of indications to plant operators that an EAL has been exceeded, and to promptly declare the emergency condition.

Conclusion

Subject to Permit Conditions 8 and 9, the staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Planning Standard D. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(4) and 10 CFR Part 50, Appendix E, Sections IV.B and IV.C, insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations.

13.3.4.3.5 Notification Methods and Procedures

As stated in NUREG-0654, Planning Standard E, "Notification Methods and Procedures," 10 CFR 50.47(b)(5) requires that procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; that the content of initial and follow-up messages to response organizations and the public has been established; and that the means to provide early notification and clear instruction to the populace within the 16-km (10-mi) plume exposure pathway EPZ have been established. In addition, 10 CFR Part 50, Appendix E, Section IV.A.4 requires a description of how offsite dose projections will be made and the results transmitted to State and local authorities, NRC, and other appropriate governmental entities. 10 CFR Part 50, Appendix E, Section IV.C requires a description of EALs and emergency conditions that involve alerting or activating the emergency organization, including communication steps to be taken under each class of emergency, and the existence of a message-authentication scheme. 10 CFR Part 50, Appendix E, Section IV.D.1 requires a description of administrative and physical means for notifying local, State, and Federal officials and agencies and agreements reached with these officials and agencies for the prompt notification of the public and for public evacuation or other protective measures. The description shall include identification of the appropriate officials, by title and agency, of the State and local government agencies within the EPZs. 10 CFR Part 50, Appendix E, Section IV.D.3 requires the licensee to have the capability to notify responsible State and local governmental agencies within 15 minutes after declaring an emergency. The licensee shall demonstrate that appropriate governmental authorities have the capability to make a public alerting and notification decision promptly on being informed by the licensee of an emergency condition, and that administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway EPZ. The alerting and notification capability shall include a backup method. Finally, 10 CFR 50.72(a)(3) requires NRC notification no later than 1 hour after declaring an emergency.

In ESP Plan Section 6, "Notification Methods – Response Organizations," the applicant described notification of ERO personnel; State, county, and Federal agencies; and the general public during a declared emergency. The staff reviewed this section, as well as other relevant portions of the application, to determine whether the application conforms to the applicable guidance and complies with the pertinent regulatory requirements. The staff's primary focus was to evaluate the emergency plan against NUREG-0654, Planning Standard E, which provides the detailed evaluation criteria that the staff should consider to determine whether the emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(5).

Notification actions taken by PSEG for each of the four emergency classification levels are described in ESP Plan Table 6-1, and Figure 6-1 provides a block diagram of notification method. ESP Plan Attachment 1-1.4 includes a listing of typical onsite EIPs, which include EPIP 204P, "Emergency Response Callout/Personnel Recall." Emergency communication systems are described in ESP Plan Section 7 and discussed in Section 13.3.4.3.6 of this report.

The station plant paging systems are used to notify onsite personnel of emergency conditions and whether activation of emergency response facilities might be required. An automated Emergency Outdial System computer is used to call out the balance of emergency response personnel for full organizational augmentation and activation of emergency response facilities. The system activates appropriate digital group pagers while simultaneously calling other personnel on the telephone. Additional PSEG telephone notifications, including to the NRC, are

made in accordance with applicable Event Classification Guide Attachments and EPIPs. ITAAC 2.2 states that a test of the primary and backup ERO notification system will be performed.

The initial notification to the States of an emergency or a change in emergency classification is made to the State Police Headquarters of New Jersey and Delaware. Upon completion of the initial message, each State Police Headquarters verifies the call by performing a callback check, and then makes the notifications indicated in ESP Plan Figures 6-2 and 6-3. The procedures for initial notifications to the States of New Jersey and Delaware are identical for all emergency classes. Once activated, the Delaware Emergency Management Agency will take initial notifications, rather than the Delaware State Police. This notification is made promptly following the declaration of the emergency (within 15 minutes). An example of the message format for this initial notification used in the emergency procedures is provided in ESP Plan Figure 6-4 and appropriate forms are utilized for each emergency classification. In addition, ESP Plan Section 4.3.1 states that the NRC is notified via a dedicated telephone line (i.e., the Emergency Notification System (ENS)) from the Control Room, TSC, or EOF to the NRC Rockville, MD, Operations Center within 1 hour after identifying the existence of an emergency condition. (See Section 13.3.4.3.10 of this report, which addresses NRC Bulletin 2005-02.)

ITAAC 2.1 states that the States of Delaware and New Jersey, and Kent, New Castle, Cumberland, and Salem Counties received notification within 15 minutes after the declaration of an emergency from the Control Room, TSC, or EOF. In addition, ITAAC 8.1.1.B.2 states that the licensee demonstrated the ability to notify responsible State agencies within 15 minutes and the NRC within 60 minutes after declaring an emergency.

For events classified as an unusual event, alert, or site area emergency, each State, after being notified by PSEG, initially notifies the local authorities. If, however, PSEG has not been able to contact a State, PSEG directly notifies the local (county) authorities. All initial notifications must be accomplished within 15 minutes. Accident assessment, protective action recommendations, and other information normally provided to the State are communicated to the local authorities (or other agencies, as provided in the memorandum of understanding with the State) until the State assessment agency assumes its communications and assessment responsibilities. ESP Plan Section 10, "Accident Assessment," describes how offsite dose projections will be made, and is addressed in Section 13.3.4.3.9 of this report. ESP Plan Section 11, "Protective Response," describes how offsite protective action recommendations will be made, and is addressed in Section 13.3.4.3.10 of this report.

For events classified as a general emergency, PSEG makes direct contact with the States of New Jersey and Delaware. If the States cannot be contacted within 15 minutes, PSEG notifies the local governments (counties) and the USCG. After this initial contact, the States (or counties) will be responsible for assessing the information provided, activating their response organization (as required), notifying appropriate local governments, and the public. After being contacted by the State (or PSEG), each county and the USCG are responsible for assessing the information provided and activating its response organizations.

After initial notification, the States make a determination on protective actions and activation of the prompt alerting and notification system. This system can be activated directly by Salem County in New Jersey and by the Delaware State Police in Delaware for a rapidly developing emergency. ITAAC 2.3 states that a full test of the Prompt Alerting and Notification System and the Emergency Alert System capabilities will be conducted, such that notification and clear

instructions to the public will be accomplished in accordance with the emergency plan requirements.

The procedures for follow-up communications with the States of New Jersey and Delaware are identical for all emergency classes. The follow-up communications with the States is initiated by a return call from the authorized State agency. For the State of Delaware, the Delaware Emergency Management Agency is responsible for follow-up communications. For the State of New Jersey, the Department of Environmental Protection, Bureau of Nuclear Engineering, and/or the New Jersey State Police Office of Emergency Management are responsible for follow-up communications. ESP Plan Figure 6-5 provides an example message format for follow-up communications used in the EPIPs. Follow-up communications with the local authorities are provided by the appropriate State agency for all emergency classifications. ITAAC 8.1.1.B.2.b addresses the transmission of follow-up notification information using the designated checklist.

The existing SGS/HCGS site's prompt alerting and notification system will be used by the PSEG Site. After initial notification, it is the responsibility of the States to make a determination regarding protective actions and to decide whether to activate the prompt alerting and notification system. The prompt alerting and notification system (shown in ESP Plan Figure 6-6), which is operated by the States and controlled from a location that is staffed continuously (24 hours), provides notification to the population within 8 km (5 mi) of the PSEG Site in 15 minutes or less after a protective action decision requiring notification, and notification to the population within 8 to 16 km (5 to 10 mi) in 45 minutes or less after a protective action decision requiring notification. The system includes both a siren and public-address system. Siren coverage is provided to population centers throughout the plume exposure EPZ and selected areas known to have recreational or transient populations (see ESP Plan Figure 6-7). The public-address system, which is used for waterborne transient boaters within the plume exposure EPZ, consists of a radio alert and notification system that is coordinated by the USCG and supplemented by broadcasts via the Emergency Alert System (EAS) and National Oceanographic and Atmospheric Administration (NOAA) weather radio. The USCG and States also dispatch boats and helicopters to make direct contact with boaters.

Land use within the PSEG Site plume exposure EPZ is principally rural. The area within 8 km (5 mi) of the PSEG Site is largely water and marshland. This area attracts only a limited number of hunters and trappers, most of whom are local residents. The agencies in charge of parks and recreation, the Delaware National Guard, the marine police, and State police assist in the notification of transients within their jurisdictions. These agencies may use motor vehicles, aircraft, boats, and roadblocks to alert and notify transients. The methods used to inform and educate the transient population of the prompt alerting system, and their required response is provided in ESP Plan Section 8.0. As a backup alerting and notification capability that augments the prompt alerting subsystems, public-address systems can be used by police and fire personnel for route alerting.

In its Interim Finding Report for Reasonable Assurance, FEMA found that the offsite emergency plans are adequate for this planning standard and the associated evaluation criteria in NUREG-0654.

As described above, the staff finds that procedures for notification of State and local response organizations and emergency personnel by all organizations have been established, and the licensee has the capability to notify offsite officials and agencies, including State and local

governmental agencies within 15 minutes, and the NRC no later than 1 hour, after declaring an emergency. The appropriate officials of the State and local government agencies within the EPZs have been identified. The licensee has described the entire spectrum of emergency conditions that involve alerting or activating the total emergency response organization, including EALs for offsite agency notification and communication steps to be taken under each class of emergency. Message authentication is described in the State and local emergency plans. The applicant has also described how appropriate governmental authorities have the capability to make a public alerting and notification decision promptly following notification of an emergency by the licensee, and administrative and physical means have been established for alerting and providing prompt instruction to the public within the plume exposure pathway EPZ (including a backup method to alert populations), and for public evacuation and other protective measures. In addition, the applicant has described how offsite dose projections will be made and the results transmitted to State and local authorities, the NRC, and other appropriate governmental entities.

Conclusion

The staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Planning Standard E. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(5), 10 CFR 50.72(a)(3), and 10 CFR Part 50, Appendix E, Sections IV.A.4, IV.C, IV.D.1, and IV.D.3, insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations.

13.3.4.3.6 Emergency Communications

As stated in NUREG-0654, Planning Standard F, "Emergency Communications," 10 CFR 50.47(b)(6) requires that provisions exist for prompt communications among principal response organizations, to emergency personnel, and to the public. In addition, 10 CFR Part 50, Appendix E, Section IV.E.9 requires onsite and offsite communication systems with backup power sources, including provisions for communications with State and local governments within the plume exposure EPZ, and Federal emergency response organizations and the NRC. Also required are provisions for communications among the Control Room, TSC, EOF, principal State and local EOCs, and field assessment teams. Communication systems shall be tested at designated frequencies.

In ESP Plan Section 7, "Emergency Communications," the applicant described the provisions used for communications between the PSEG Site and principal response organizations, as well as between the emergency response facilities. (Notification to, and communications with, the public is described in ESP Plan Sections 6 and 8, and addressed in Sections 13.3.4.3.5 and 13.3.4.3.7, respectively, of this report. The staff reviewed this section, as well as other relevant portions of the application, to determine whether the application conforms to the applicable guidance and complies with the pertinent regulatory requirements. The staff's primary focus was to evaluate the emergency plan against NUREG-0654, Planning Standard F, which provides the detailed evaluation criteria that the staff should consider to determine whether the emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(6).

The station's plant paging systems are used to notify onsite personnel that emergency conditions exist and that activation of emergency response facilities might be required. This includes the PSEG Site public-address system, which is a voice-communication system located throughout the plant. PSEG also maintains multiple radio systems that support station

operations, fire protection, security, and onsite and offsite field monitoring teams. ITAAC 3.1(b) states that a test will be performed to demonstrate (both primary and secondary methods/systems) the ability to communicate from the TSC and the EOF to PSEG field monitoring teams. ESP Plan Table 7-1 summarizes the dedicated and commercial communications services maintained in emergency response facilities onsite and offsite. ESP Plan Section 15, "Exercises and Drills," addresses communication systems testing.

To assure that external notifications and communications are available during an emergency, PSEG maintains both dedicated and commercial communication systems as part of its emergency response capabilities. The existing SGS and HCGS emergency communication systems will be used by the PSEG Site. Provisions are in place for establishing and maintaining (on a 24-hour basis) communications with the States of New Jersey and Delaware, the 16-km (10-mi) EPZ counties, Lower Alloways Creek Township, and the NRC. Organizational titles associated with communications are identified in ESP Plan Section 3, "Emergency Organization," and initial and follow-up notification is addressed in ESP Plan Section 6, "Notification Methods – Response Organizations." The available communication systems include the Nuclear Emergency Telecommunications System (NETS), Centrex/Electronic Switch System Exchange (Centrex/ESSX 1), and Direct Inward Dial (DID) system.

NETS, which is a privately controlled and self-contained telephone exchange that operates as a closed system, is dedicated to emergency response use and is the primary communication system between the PSEG Site, the States, and counties. NETS telephones are located in onsite and offsite PSEG emergency response facilities, as well as the EOC facilities of the States and counties. The system is used to notify the States for all EALs and provide emergency communications with the counties, and may use PSEG microwave, commercial telephone-system microwave, fiber optics, or buried cable transmission. As an independent system with an uninterruptible power supply, NETS can operate with or without local phone service or external power.

The secondary communications to the States and counties are provided by both the Centrex/ESSX 1 and DID systems, which are strategically placed throughout emergency facilities. Centrix/ESSX 1 is a privately controlled exchange, which PSEG operates with its own microwave signal system, and is considered the primary backup for NETS. This system is also independent of local phone service, because each circuit is independently wired. DID is the principal telephone system used for normal business at the site. DID is also a backup system for emergency response, and allows station telephones to be extensions or tied lines of the same systems. These exchanges can take advantage of backup power supplies provided to the station, and may use PSEG microwave, commercial telephone-system microwave, or buried cable-transmission systems to maintain external communications.

Additional methods for State and county contacts include Emergency Radio (EMRAD) and the National Attack Warning and Alert System (NAWAS). The Federal Telecommunications System (FTS) provides a dedicated communication system with the NRC and is installed in the Control Room, TSC, and EOF. ITAAC 3.1(a) states that a test will be performed to demonstrate (both primary and secondary methods/systems) the ability to communicate from the Control Room, TSC, and the EOF to responsible State and local government agencies.

In RAI 22, Question 13.03-13, the staff requested that the applicant describe the components and availability of FTS. In a July 21, 2011, response to RAI 22, Question 13.03-13, the applicant stated that the Control Room and TSC designs are not complete because a reactor

technology has not been selected, and that the PSEG Site FTS design will be developed following the selection of a reactor technology. Pursuant to 10 CFR 52.39(b), an applicant for a COL that references this ESP shall update the emergency preparedness information that was provided under 10 CFR 52.17(b), and discuss whether the updated information materially changes the bases for compliance with applicable NRC requirements. As such, the staff identified the following COL action item to address the selection of a reactor technology to be built at the PSEG Site, including the description of the FTS.

COL Action Item 13.3-2

An applicant for a COL or CP referencing this early site permit should revise the emergency plan to describe the components, availability, and power supplies for the Federal Telecommunications System (FTS), including all required communications and data links associated with the chosen reactor technology.

As described above, the staff finds the applicant's response to RAI 22, Question 13.03-3, acceptable and, therefore, considers RAI 22, Question 13.03-13, resolved.

In RAI 47, Question 13.03-26, the staff requested that the applicant discuss the availability of the Reactor Safety Counterpart Link (RSCL), Protective Measures Counterpart Link (PMCL), Management Counterpart Link (MCL), and Local Area Network (LAN). In a March 7, 2012, response to RAI 47, Question 13.03-26, the applicant stated that emergency plan supporting documentation (e.g., Communication Checklist Procedures EP-AA-124-1001-F12, -F13, and -F14) identifies specific FTS lines, including RSCL lines, PMCL lines, Health Physics Network (HPN) lines, ENS lines, an MCL line, and a LAN line. ITAAC 3.2 addresses establishment of communications associated with the ENS, HPN, and the Emergency Response Data System (ERDS). ERDS supplements the existing voice transmission over the ENS, and is discussed in Section 13.3.4.3.8 of this report. The staff finds the applicant's response to RAI 47, Question 13.03-26, acceptable and, therefore, considers RAI 47, Question 13.03-26, resolved.

Fukushima Dai-ichi – NTTF Recommendation 9.3

In RAI 65, Question 13.03-29, the staff requested that the applicant address staffing and communications provisions for enhancing emergency preparedness, as addressed in Recommendation 9.3 of the NRC NTTF review of the accident at the Fukushima Dai-ichi nuclear facility. With regard to communications, the accident at Fukushima highlighted the need to ensure that the communications equipment relied on to coordinate the event response during a prolonged station blackout can be powered. Specifically, NTTF Recommendation 9.3 requests that all power reactor licensees and holders of construction permits (in active or deferred status) assess their current communications systems and equipment used during an emergency event, including consideration of any enhancements that might be appropriate for the emergency plan with respect to the communications requirements of 10 CFR 50.47, 10 CFR Part 50, Appendix E, and NUREG-0696, "Functional Criteria for Emergency Response Facilities." In addition, the means necessary to power the new and existing communications equipment during a prolonged station blackout should be considered. (Onsite emergency organization and staffing is addressed above in Section 13.3.4.3.2 of this report.)

The applicant's September 10, 2012, response to RAI 65, Question 13.03-29, addressed both enhanced staffing and communications capabilities. The resolution of this RAI, including the

staff's proposed Permit Condition 6, associated with emergency communications, is addressed above in Section 13.3.4.3.2 of this report.

In its Interim Finding Report for Reasonable Assurance, FEMA found that the offsite emergency plans are adequate for this planning standard and the associated evaluation criteria in NUREG-0654.

Subject to Permit Condition 6, the staff finds that provisions exist for prompt communications among principal response organizations, to emergency personnel, and to the public. Specifically, the applicant established a reliable primary and backup means of communications for alerting and activating the response organizations and personnel, including 24-hour manning of communications links. Provisions also exist for communications among the Control Room, TSC, EOF, State and local governments within the EPZs, and field assessment teams. In addition, the applicant provided a coordinated communication link for fixed and mobile medical support facilities. Onsite and offsite communication systems have backup power sources and are tested at designated frequencies.

Conclusion

Subject to Permit Condition 6, the staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Planning Standard F. A COL applicant will address COL Action Item 13.3-2. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(6) and 10 CFR Part 50, Appendix E, Section IV.E.9, insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations.

13.3.4.3.7 Public Education and Information

As stated in NUREG-0654, Planning Standard G, "Public Education and Information," 10 CFR 50.47(b)(7) requires that information be made available periodically to the public concerning notification methods and initial actions the public should take in an emergency (e.g., listening to a local broadcast station and remaining indoors), that the principal points of contact with the news media for dissemination of information during an emergency (including the physical location or locations) be established in advance, and that procedures for coordinating dissemination of information to the public be established. In addition, 10 CFR Part 50, Appendix E, Section IV.D.2 requires a description of provisions for yearly dissemination to the public within the plume exposure EPZ of basic emergency planning information, such as methods for public notifications and protective actions planned if an accident occurs, general information as to the nature and effects of radiation, and a listing of local broadcast stations that will be used for dissemination of information during an emergency. Signs or other measures shall also be used to disseminate information to any transient population within the plume exposure pathway (16-km (10-mi)) EPZ.

In ESP Plan Section 8, "Public Information," the applicant described the PSEG public education and information program, including the process for keeping the public in the 16-km (10-mi) EPZ informed in the event of an emergency. The staff reviewed this section, as well as other relevant portions of the application, to determine whether the application conforms to the applicable guidance and complies with the pertinent regulatory requirements. The staff's primary focus was to evaluate the emergency plan against NUREG-0654, Planning Standard G, which provides the detailed evaluation criteria that the staff should consider to determine

whether the emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(7).

The public information program consists of general information regarding nuclear energy, radiation, and emergency planning, which is provided at least annually as an insert in local publications. This includes educational information on radiation, contacts for additional information, public-response options of sheltering or evacuation, evacuation routes, relocation centers, and special considerations for the handicapped. This information is provided to the transient population and permanent residents of the 16-km (10-mi) EPZ in the form of pamphlets, advertisements in locally distributed newspapers or telephone books, placards, or postings at recreational facilities. Annually, selected information is either updated and redistributed or verified to be in place at appropriate locations. PSEG provides an information program for the media and the general public, which includes distributing training information along with an invitation to annually observe a training drill. During the May 6 and 7, 2010, site area visits, the staff observed several emergency siren signs within the 16-km (10-mi) EPZ, which provided instructions to tune to specific radio stations for emergency information if the siren sounds for 3 to 5 minutes.

ESP Plan Section 9.6, "Emergency News Center/Joint Information Center (ENC/JIC)," states that the ENC/JIC facilities are at the Salem County 911 Center. The facility can support use by 100 or more media personnel, including space for media briefings, and separate work areas are maintained for PSEG, NRC, State, and county personnel. ESP Plan Section 8.2.0, "Public Information During an Emergency," states that upon activation of the ENC/JIC, all information provided to the news media is approved by the Company Spokesperson (or ENC Manager) and State of New Jersey. ENC/JIC communications equipment is addressed in ESP Plan Section 7 and summarized in ESP Plan Table 7-1. ITAAC 4.1 states that the ENC/JIC included equipment to support the ENC/JIC operations, including communications with the TSC, EOF, principal State and local EOCs, and the news media. In addition, ITAAC 8.1.1.F states that the licensee will demonstrate the capability to develop and disseminate information to the news media, and establish rumor control.

In RAI 66, Question 14.03.10-1, the staff requested that the applicant make various minor revisions to the EP-ITAAC table in the ESP Plan, Revision 1, Attachment 10 to be consistent with the generic ITAAC in NUREG-0800, Section 14.3.10, Table 14.3.10-1, and to provide clear and objective ITAAC. (Affected EP-ITAAC include ITAAC 4.1, 6.1, 6.3, 6.5, 6.6, 6.8, 8.1.1.E.2.b, 8.1.3, and 10. The revised versions of these ITAAC are reflected in the respective sections, as well as Table 13.3-1 of this report, except for ITAAC 10 which was deleted.) In an October 19, 2012, response to RAI 66, Question 14.03.10-1, the applicant proposed changes to ESP Plan, Revision 1, Attachment 10 that are consistent with the staff's identified revisions, and included the changes in ESP Plan, Revision 2. The staff finds the applicant's response to RAI 66, Question 14.03.10-1, acceptable and, therefore, considers RAI 66, Question 14.03.10-1, resolved.

The Public Information Liaison, located in the EOF, will ensure that the necessary information is provided to the ENC/JIC by the emergency response organization. A timely exchange of information is ensured among the designated spokespersons for PSEG and representatives of the States of New Jersey and Delaware by systematically recording the receipt of news bulletins. ESP Plan Section 3.9.7.G, "Public Information," describes the various ENC/JIC staff positions and associated duties. This includes the Emergency News Center Manager, who is responsible for the overall operation of the ENC/JIC, including the dissemination of information

and media monitoring. The Company Spokesperson is a senior management representative responsible for representing the applicant in news-media briefings, and acts as the official Company Spokesperson. The Public Information Manager is responsible for representing PSEG as Company Spokesperson until activation of the ENC/JIC, and has the authority to release information provided by the Emergency Coordinator concerning any event at the PSEG Site that might be of interest to the media and the public.

In ESP Plan Section 8.4.0, "Rumor Control (Public Inquiry)," the applicant stated that rumor control is accomplished by providing information to other public information sources simultaneously and by providing public information officers with access to the PSEG public information source. Additionally, telephone access numbers are listed in the annual public information brochure so the public can contact officials who can quickly confirm or deny the accuracy of a given report or rumor. The Rumor Control Coordinator is responsible for coordinating the media monitoring effort and the dissemination of information about the emergency using PSEG's Rumor Control Network.

In its Interim Finding Report for Reasonable Assurance, FEMA found that the offsite emergency plans are adequate for this planning standard and the associated evaluation criteria in NUREG-0654.

The staff finds that the applicant provided for a coordinated and periodic dissemination of information to the public, including the permanent and transient adult population within the plume exposure (16-km (10-mi)) EPZ, regarding how they will be notified and what their actions should be in an emergency. The applicant also established the principal points of contact with the news media for dissemination of information during an emergency, and procedures for coordinated dissemination of information to the public. In addition, the applicant described the provisions for yearly dissemination to the public within the plume exposure EPZ of basic emergency planning information, including the use of signs or other measures to disseminate information to any transient population within the plume exposure EPZ.

Conclusion

The staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Planning Standard G. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(7) and 10 CFR Part 50, Appendix E, Section IV.D.2, insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations.

13.3.4.3.8 Emergency Facilities and Equipment

As stated in NUREG-0654, Planning Standard H, "Emergency Facilities and Equipment," 10 CFR 50.47(b)(8) requires that adequate emergency facilities and equipment to support the emergency response be provided and maintained. In addition, 10 CFR Part 50, Appendix E, Section IV.E.8 requires that adequate provision be made and described for emergency facilities and equipment, including a licensee's onsite OSC and TSC, as well as an EOF from which effective direction can be given and effective control can be exercised during an emergency. 10 CFR Part 50, Appendix E, Section IV.E.8.b addresses various requirements associated with EOF locations and required provisions, which are not applicable to an existing EOF pursuant to 10 CFR Part 50, Appendix E, Section IV.E.8.e. 10 CFR Part 50, Appendix E, Section IV.E.8.c requires various EOF capabilities, which include supporting response to multiple reactors/sites and simultaneous events, as applicable. 10 CFR Part 50,

Appendix E, Section IV.E.8.d requires an alternative facility (for use when onsite emergency facilities cannot be safely accessed during hostile actions) that would be accessible and could function as a staging area for augmentation of emergency response staff. 10 CFR Part 50, Appendix E, Section IV.G requires a description of provisions to be employed to ensure that the emergency plan, its implementing procedures, and emergency equipment and supplies are maintained up to date. 10 CFR Part 50, Appendix E, Section VI.1 requires an ERDS data link between the licensee's onsite computer system and the NRC Operations Center, through which a limited data set of selected parameters can be automatically transmitted.

In ESP Plan Section 9, "Emergency Facilities and Equipment," the applicant described the functions and locations of the emergency response facilities and equipment that will be used and maintained by PSEG in coordinating and performing emergency response activities. The staff reviewed this section, as well as other relevant portions of the application, to determine whether the application conforms to the applicable guidance and complies with the pertinent regulatory requirements. The staff's primary focus was to evaluate the emergency plan against NUREG-0654, Planning Standard H, which provides the detailed evaluation criteria that the staff should consider to determine whether the emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(8).

Emergency facilities and equipment are maintained both onsite and offsite, and were developed to meet the intent of NUREG-0737, Supplement 1, "Requirements for Emergency Response Capability," except as indicated otherwise in the emergency plan. Emergency preparedness inventory procedures include detailed equipment listings, and the equipment is inventoried and operationally checked quarterly and after each use. The instrument calibration frequency has been established in accordance with appropriate technical guidance, and allowance is made for replacement in the event of normal servicing and calibration. ESP Plan Table 9-1 lists typical equipment that is maintained both onsite and offsite. ESP Plan Attachments 6 through 9 provide information relating to the location, design, habitability, and monitoring capabilities of the PSEG Site Control Room, TSC, OSC, onsite laboratories, and decontamination facilities.

The onsite radiation monitoring capability for the four respective technologies considered includes an installed process, effluent, and area Radiation Monitoring System (RMS); portable survey instrumentation; counting equipment for radiochemical analysis; and a personnel dosimetry program to record integrated exposure. The area monitoring system provides information on radiation levels in various areas of the plant and has Control Room and local readout and audible alarms. In addition, a wide range of gas monitors are installed at normal effluent release points, and provide readout and alarm functions to the Control Room. ESP Plan Section 10 describes equipment and instrumentation (including the RMS and Safety Parameter Display System (SPDS)) that supports monitoring and assessment of operational, radiological, and geophysical events. Section 13.3.4.3.9 of this report documents the staff review of ESP Plan Section 10 and includes COL Action Item 13.3-4, which addresses radiation monitoring and other systems and equipment associated with the chosen reactor technology.

Initial monitoring and decontamination is performed onsite in the decontamination area at each Control Point or other suitable location. During normal operations, the Control Point serves PSEG Site as the access control point for personnel entering or leaving the Radiological Controlled Area. Radiation Protection/Chemistry personnel also support onsite corrective actions, access control, personnel monitoring, dosimetry, search and rescue, and first aid. Personnel monitoring and decontamination are addressed in ESP Plan Sections 11 and 12 and discussed in Sections 13.3.4.3.10 and 13.3.4.3.11 of this report, respectively. Arrangements for

medical services are also addressed in ESP Plan Section 13, and discussed in Section 13.3.4.3.12 of this report.

ESP Plan Table 7-1 summarizes the dedicated and commercial communications services maintained in emergency response facilities onsite and offsite. Supplementing the existing voice transmission over the ENS is the ERDS, which is a direct (near-realtime) electronic data link between the licensee's onsite computer system and the NRC Operations Center through which a limited data set of selected parameters can be automatically transmitted. In ESP Plan Attachment 1-1.8, the applicant listed typical emergency preparedness administrative procedures, including emergency support equipment procedure PC.EP-FT.ZZ-0006(Q), "Emergency Response Data System (ERDS) Test with NRC." In RAI 22, Question 13.03-18, the staff requested that the applicant address whether ERDS is tested quarterly. In a July 21, 2011, response to RAI 22, Question 13.03-18, the applicant stated that ERDS will be tested quarterly in accordance with NRC Inspection [Information] Notice 2008-15, "ERDS Test Schedule Revised," and that the requirement to test ERDS will be included in the emergency plan's functional test procedure for the new plant, in a way similar to ERDS testing at both SGS and HCGS. ITAAC 3.2 addresses establishment of communications associated with the ENS, HPN, and ERDS. The staff finds the applicant's response to RAI 22, Question 13.03-18, acceptable and, therefore, considers RAI 22, Question 13.03-18, resolved.

The offsite environmental radiological monitoring program includes thermoluminescent dosimeters (TLDs) in neighboring towns and cities, at schools and public assembly points, and at numerous locations close to the station. Additional resources and capabilities for offsite environmental monitoring and analysis, including meteorological consultation, are identified in ESP Plan Section 4 and discussed in Section 13.3.4.3.3 of this report. Meteorological monitoring capabilities are also addressed in ESP Plan Section 10 and discussed in Section 13.3.4.3.9 of this report. ITAAC 8.1.1.D.2 addresses the adequacy of equipment, security provisions, and habitability precautions for the TSC, OSC, EOF, and ENC/JIC.

Control Room

The Control Room continues its control functions during emergency response. The classification and notification responsibilities are met from the Control Room until other emergency facilities are activated. The PSEG Site Control Room is designed to meet the habitability requirements of 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 19. ESP Plan Table 9-1 lists typical radiological protection emergency equipment that is available to the Control Room personnel. Control Room communication systems are addressed in ESP Plan Section 7 and discussed in Section 13.3.4.3.6 of this report. Table 13.3-1 of this report includes various ITAAC associated with the Control Room. ITAAC 1.1 addresses the ability to retrieve EAL scheme parameters; ITAAC 6.4 addresses the availability of meteorological information; and ITAAC 3.1, 3.2, and 5.2.1 address communication systems.

Technical Support Center

The TSC provides an onsite location to support plant management during an emergency, and functions as an augmented communication/analysis center of technical data to supplement the Control Room staff's technical analysis and support plant operations personnel. The TSC is used by members of the ERO to relieve Control Room operators of any plant specific duties not directly related to the direct handling of plant controls. Such duties include directing analysis and assessment of the emergency conditions and performing functions associated with the EOF (when the EOF is not activated). The TSC is used as the assembly point for PSEG personnel,

onsite vendor support, the NRC, and personnel who are directly involved in accident assessment and mitigation.

The location of the TSC depends on the reactor technology and is addressed in the respective design control documents (DCDs) for the AP1000, ABWR, US-APWR, and U.S. EPR (cited in ESP Plan Attachments 6, 7, 8, and 9, respectively). ESP Plan Attachments 6 through 9 also state that the TSC is located within the Protected Area for each design, and address various TSC characteristics, such as size, habitability, power supply, and plant parameter displays. The TSC's location, size, and habitability for each reactor design are evaluated as part of the separate DCD reviews.

The TSC can be staffed and activated within 90 minutes of an Alert or higher emergency classification, although this staffing and activation time could vary if severe weather conditions or acts of nature or terrorism are experienced at the same time as the ERO callout. (ESP Plan Section 3 addresses TSC activation and staffing, which is discussed in Section 13.3.4.3.2 of this report.) (Refer to the June 26, 2008, Safety Evaluation, which addresses approval of the 90-minute personnel response and activation time goal for the emergency response facilities supporting SGS and HCGS for additional discussion (ADAMS Accession No. ML081690552)). When activated, the TSC becomes the primary onsite communications center during an emergency, and provides reliable voice communications to the Control Room OSC, EOF, NRC, and other offsite agencies. If the TSC becomes uninhabitable for any reason, TSC personnel will transfer to an unaffected station TSC.

Analytical and assessment capabilities assigned to the TSC include plant engineering support, computerized dose assessment, and the SPDS. ESP Plan Table 9-1 lists typical radiological-protection emergency equipment that is available to the TSC personnel. TSC communication systems are addressed in ESP Plan Section 7 and discussed in Section 13.3.4.3.6 of this report. Documentation available within the TSC supports emergency assessments, classification, and procedures. ESP Plan Attachment 1-1.4 includes these TSC-related EIPs:

- PC.EP-EP.ZZ-0201(Q), "TSC – Integrated Engineering Response"
- PC.EP-EP.ZZ-0203(Q), "Administrative Support/Communication Team Response - TSC"
- PC.EP-EP.ZZ-0205(Q), "TSC – Post Accident Core Damage Assessment"

In RAI 47, Question 13.03-27, the staff requested that the applicant describe the availability in the TSC of the RMS and SPDS plant parameter variables, including those identified in RG 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants." In a March 7, 2012, response to RAI 47, Question 13.03-27, the applicant stated that the identification of specific plant parameter variables is dependent on the type of reactor selected for the site. At the COL stage, the specific post-accident parameters for the selected technology will be fully defined, and PSEG will update the emergency plan to identify the specific monitoring capability for the radiological parameters identified in RG 1.97. As discussed above, emergency facilities and equipment (including those that display available plant parameters and meteorological variables) were developed to meet the intent of NUREG-0737, Supplement 1, which references RG 1.97, Revision 2. This action at the COL stage is discussed in Section 13.3.4.3.9 of this report and is reflected in COL Action Item 13.3-4. The staff finds the applicant's response to RAI 47, Question 13.03-27, acceptable and, therefore, considers RAI 47, Question 13.03-27, resolved.

ITAAC 5.1 states that an inspection of the as-built TSC and OSC will be performed, including a test of their capabilities. The associated acceptance criteria address TSC size, habitability, communication, and backup power, as well as the availability of plant and environmental information, and the capability to conduct emergency assessment. ITAAC 8.1.1.D addressed TSC activation, operation, and the adequacy of equipment. ITAAC 8.1.1.C.1 addresses the capability of the TSC to direct and control emergency operations.

Operations Support Center

The OSC is an onsite area, separate from the Control Room and TSC, where licensee operations support personnel will assemble in an emergency. The location of the OSC depends on the reactor technology and is addressed in ESP Plan Attachments 6 through 9. ITAAC 5.1.6 states that there is an OSC located inside the Protected Area. The design control documents (DCDs) for the AP1000, ABWR, and U.S. EPR identify the specific OSC location. The US-APWR DCD does not include an OSC as part of the standard design; therefore, the OSC location will be determined at a later time. Pursuant to 10 CFR 52.39(b), an applicant for a COL that references this ESP shall update the emergency preparedness information that was provided under 10 CFR 52.17(b), and discuss whether the updated information materially changes the bases for compliance with applicable NRC requirements. As such, the staff identified the following COL action item to address the OSC location for the US-APWR reactor design.

COL Action Item 13.3-3

An applicant for a COL or CP referencing this early site permit and the US-APWR standard design should revise the emergency plan to describe the location and capabilities of the Operations Support Center (OSC).

The PSEG Site OSC functions as an information relay station, dispatching office, assembly and assignment point, and accountability station for teams assigned from the OSC. In the event of an emergency, operations personnel not on duty and other support personnel report to the OSC to form repair and corrective action teams. ESP Plan Section 3 addresses OSC activation and staffing, and ESP Plan Attachment 1-1.4 includes these OSC-related EIPs.

- PC.EP-EP.ZZ-0202(Q), "Operations Support Center (OSC) Activation and Operations"
- PC.EP-EP.ZZ-0304(Q), "Operations Support Center (OSC) Radiation Protection Response"

The TSC will serve as a backup OSC, if required. ESP Plan Table 9-1 lists typical radiological-protection emergency equipment that is available to the OSC personnel. OSC communication systems are addressed in ESP Plan Section 7 and discussed in Section 13.3.4.3.6 of this report. ITAAC 5.1.2 states that communication equipment is installed in the TSC and OSC, and voice transmission and reception are accomplished. ITAAC 8.1.1.D addresses OSC activation, operation, and the adequacy of equipment.

Emergency Operations Facility

The EOF is a licensee-controlled and -operated offsite support center, which serves as the near-site support center for management of the aggregate response to a radiological emergency at SGS, HCGS, and the proposed new plant at the PSEG Site. The EOF is located in the PSEG Energy and Environmental Resource Center (EERC) in Salem, NJ, approximately

12 km (7.5 mi) from the TSC.² This site is judged by the applicant to provide operational and logistical benefits with regard to its relationship to the area's transportation system, which makes the EOF readily accessible by road and air to designated personnel of all agencies and activities assigned an emergency response role by the emergency plan. The location makes possible rapid movement of personnel between the station and the EOF, as well as collection and assessment of offsite radiological monitoring information from the survey teams. In addition, an alternate near-site location at the EERC has been identified and equipped by the applicant, in the event that a security or other event prevents the ERO from reporting to the primary onsite emergency response facilities.

Approximately 487 m² (5240 ft²) of floor space in the EERC is designated for use as the EOF, which provides approximately 7 m² (75 ft²) of workspace per person for a staff of up to 70 persons and 60 m² (650 ft²) for conference rooms. Additional space is available in the building for another 100 persons. The functional layout of the EOF depicts designated workspace for emergency response activities, equipment, functional displays, and storage of plant records. The EOF provides facilities and equipment to support staff performance of these major functions:

- Management of overall emergency response activities
- Coordination of radiological and environmental assessment
- Development of recommendations for protective actions for the public
- Coordination of emergency response operations with Federal, State, and local agencies

The EOF is staffed by PSEG and other emergency personnel designated by the PSEG emergency plan. Facilities are provided in the EOF for NRC, FEMA, New Jersey, Delaware, and local emergency response agency personnel responsible for implementing emergency response actions for protection of the general public. The EOF can be staffed and activated, or ready to activate, within 90 minutes of an Alert or higher emergency classification, although this time could vary if severe weather or acts of nature or terrorism are experienced at the same time as the ERO callout. (See the June 26, 2008, Safety Evaluation, cited above for TSC activation within 90 minutes.) To ensure EOF activation readiness, PSEG provides normal industrial security for the EOF complex. When activated, EOF access is restricted to authorized personnel by the industrial security system.

Equipment is provided in the EOF for the acquisition, recording, display and evaluation of containment and operational conditions, radiological releases, and meteorological data. The data is analyzed and evaluated to determine the nature and scope of any protective measures, which may be recommended to State and local officials for protection of the public health and safety, if the magnitude and potential effects of a radioactive release dictate. The equipment includes a display of information collected by the RMS. In addition, radiological monitoring equipment in the facility has the capability to monitor EOF airborne radioactivity, in order to ensure that personnel are not subjected to adverse radiological conditions. All equipment, displays, and instrumentation to be used to perform essential EOF functions are located in the EOF, and ESP Plan Table 9-1 lists typical radiological protection emergency equipment that is

² In SECY-84-63, "Backup Emergency Operations Facility for the Salem Generating Station, Units 1 and 2," February 6, 1984, the staff proposed that the NRC approve the Public Service Electric and Gas Company's (PSE&G's) request for an exception from the requirement for a backup EOF for SGS Units 1 and 2 (Docket Nos. 50-272 and 50-311), April 20, 1981. On February 23, 1984, the NRC found the exception request acceptable, and PSE&G was notified of the approval in a letter (D. Eisenhut to E. Liden), March 5, 1984.

maintained at the EOF, including EOF field team kits. Backup power is provided to the EOF by a diesel generator to supply facility lighting, the telephone system, and all EOF data and communications systems.

ITAAC 5.2 states that an inspection of the EOF will be performed, including a test of the capabilities. The associated acceptance criteria address EOF communications, the availability of EAL parameters, and the capability to handle events at two or more reactors on the site. ITAAC 8.1.1.D addresses EOF activation, operation, and the adequacy of equipment.

In its Interim Finding Report for Reasonable Assurance, FEMA found that the offsite emergency plans are adequate for this planning standard and the associated evaluation criteria in NUREG-0654.

The staff finds that the applicant described, provided, and maintains adequate emergency facilities and equipment to support the emergency response, including a licensee onsite OSC and TSC, and an EOF from which effective direction can be given and effective control can be exercised during an emergency. This includes onsite and offsite radiological and meteorological monitoring systems. The applicant also described provisions to be employed to ensure that the emergency plan, its implementing procedures, and emergency equipment and supplies are kept up-to-date. In addition, the applicant provided for an ERDS data link between the onsite computer system and the NRC Operations Center.

Conclusion

The staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Planning Standard H. A COL applicant will address COL Action Items 13.3-3 and 13.3-4. Therefore, staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(8) and 10 CFR Part 50, Appendix E, Sections IV.E.8, IV.G, and VI.1, insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations.

13.3.4.3.9 Accident Assessment

As stated in NUREG-0654, Planning Standard I, "Accident Assessment," 10 CFR 50.47(b)(9) requires the use of adequate methods, systems, and equipment for assessing and monitoring the actual or potential offsite consequences of a radiological emergency condition. In addition, 10 CFR Part 50, Appendix E, Section IV.A.4 requires the identification of persons within the licensee organization who will be responsible for making offsite dose projections, and a description of how these projections will be made and the results transmitted to State and local authorities, the NRC, and other appropriate governmental entities. 10 CFR Part 50, Appendix E, Section IV.B requires a description of the means to be used for determining the magnitude of, and for continually assessing the impact of, the release of radioactive materials. 10 CFR Part 50, Appendix E, Section IV.E.2 requires that adequate provisions shall be made and described for emergency facilities and equipment, including equipment for determining the magnitude of, and for continuously assessing the impact of, the release of radioactive materials to the environment.

In ESP Plan Section 10, "Accident Assessment," the applicant described the methods, systems, and equipment available for assessing and monitoring the actual or potential consequences of a radiological emergency. The staff reviewed this section, as well as other relevant portions of the application, to determine whether the application conforms to the applicable guidance and

complies with the pertinent regulatory requirements. The staff's primary focus was to evaluate the emergency plan against NUREG-0654, Planning Standard I, which provides the detailed evaluation criteria that the staff should consider to determine whether the emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(9).

In ESP Plan Section 10.1.1, "Emergency Action Level Determination," the applicant stated that plant parameter and instrument values used to identify an emergency class are provided in ESP Plan Attachment 5, which addresses EALs for the four proposed reactor technologies. As discussed in ESP Plan Section 5, a detailed description of the emergency classifications is provided in the ECG, which lists the initiating conditions and associated action levels for all emergency and non-emergency reportable events. (See Section 13.3.4.3.4 of this report, above, for a discussion of the emergency classification and action level scheme.) ITAAC 1.1(a) states that the parameters referenced in the emergency classification and EAL scheme are retrievable in the Control Room, TSC, and EOF.

ESP Plan Section 10 states that there are several monitoring systems used to support emergency planning activities at the PSEG Site. The primary systems utilized include the RMS, SPDS, and Reactor Coolant Sampling System. The radiological monitors consist of process, effluent, and area radiation monitors, which continuously display and/or record the radiation levels in key areas. To provide the operators with essential information on plant conditions during an emergency, various plant processes are continuously monitored.

The RMS includes process radiation monitors, effluent radiation monitors, and area monitors and will comply with the recommendations of NUREG-0578.³ In addition to the main plant vent, other potential major release points from the plant will be identified upon selection of the reactor technology for the PSEG Site. Procedures are utilized to monitor these potential release pathways and perform the necessary dose assessment. Reactor coolant and containment gaseous activity sampling are performed using station procedures and normal day-to-day sampling systems. The plant vent, which is the final release point, is continuously monitored by the RMS for noble gases. The iodine cartridge is physically removed and taken into a laboratory for analysis by a multi-channel analyzer available at the PSEG Site. There are also provisions provided in the plant vent to extract a grab sample. Analysis of reactor coolant and containment air samples provides detailed information on the status of the reactor core. These samples are used to provide confirmation of a loss of the fission product barriers. The applicant also stated that river water-level monitoring requirements will be determined when the reactor technology is selected.

Plume dose calculation procedures use plant effluent monitor data to project offsite doses caused by noble gases and iodines. The actual isotopic mix of the releases is used if the releases have been sampled and analyzed. Computer applications calculate offsite doses, including ingestion pathway exposures, which are compared to the protective action guides (PAGs) in the U.S. Environmental Protection Agency (EPA) guidance document, "Manual of

³ NUREG-0578, "TMI [Three Mile Island]-2 Lessons Learned Task Force Status Report and Short-Term Recommendations," July 1979, recommended improvements in post-accident radiation monitoring capability following the TMI-2 accident in 1979. The recommended improvements in NUREG-0578 were later ordered for licensees, incorporated in revisions to RG 1.97, and superseded by NUREG-0737, "Clarification of TMI Action Plan Requirements," November 1980, and NUREG-0737, Supplement 1, "Clarification of TMI Action Plan Requirements – Requirements for Emergency Response Capabilities (Generic Letter No. 82-33), January 1983.

Protective Action Guides and Protective Actions for Nuclear Incidents” (EPA 400-R-92-001)⁴. The results determine whether a protective action recommendation (PAR) is needed. When a general emergency is declared, a predetermined PAR is provided to the State governments in New Jersey and Delaware. (The transmittal of offsite dose projection results to State and local authorities is addressed in ESP Plan Section 6, and also addressed in Section 13.3.4.3.5 of this report.) Predetermined PARs are incorporated in both the ECG and EIPs. The procedures and calculation capabilities are available at the PSEG Site Control Room, Control Point, TSC, and EOF. Relevant EIPs include two onsite procedures listed in Attachment 1-1.4 and an EOF procedure listed in ESP Plan Attachment 1-1.5:

- PC.EP-EP.ZZ-0205(Q), “TSC – Post Accident Core Damage Assessment”
- PC.EP-EP.ZZ-0313(Q), “Advanced Dose Assessment (MIDAS) Instructions”
- NC.EP-EP.ZZ-0602(Q), “EOF Radiological Dose Assessment”

The RMS and SPDS provide an early indication of abnormal radiological conditions from both process and area monitors. The RMS provides radiological release rate information, and computer systems provide meteorological data acquisition for the PSEG Site. A computerized dose assessment program provides redundant emergency dose assessment modeling capability. The computer systems provide monitoring capability for the radiological parameters

identified in RG 1.97, including high range monitoring capability for effluent release paths. This data is input to the dose assessment computers at the PSEG Site. In SSAR Section 13.3, the applicant stated that following the selection of the reactor technology at the COL stage, PSEG will update the emergency plan to identify the specific monitoring capability for the radiological parameters identified in RG 1.97.

Pursuant to 10 CFR 52.39(b), an applicant for a COL that references this ESP shall update the emergency preparedness information that was provided under 10 CFR 52.17(b), and discuss whether the updated information materially changes the bases for compliance with applicable NRC requirements. As such, the staff identified the following COL action item to address the description of radiation monitoring and other systems and equipment associated with the chosen reactor technology that support accident assessment activities, as well as specific monitoring and dose-assessment and -projection modeling capabilities. Section 13.3.4.3.8 of this report also discusses the availability of plant parameter and meteorological variables in the TSC.

COL Action Item 13.3-4

An applicant for a COL or CP referencing this early site permit should revise the emergency plan to describe the radiation monitoring and other systems and equipment, including potential major release points from the plant and river water level monitoring requirements, associated with the chosen reactor technology that support accident assessment activities. The emergency plan should also identify the specific monitoring capability for the radiological parameters identified in NRC Regulatory Guide 1.97, Revision 2, and dose assessment and projection modeling system.

⁴ In March 2013, the EPA updated EPA 400-R-92-001 with “PAG manual – Protective Action Guides and Planning Guidance for Radiological Incidents,” Draft for Interim Use and Public Comment.

Dose assessment or projection represents the calculation of an accumulated dose at some time in the future, if current or projected conditions continue. During an accident, the plant parameter display system and personal computers provide the ERO with the timely information required to make decisions. Radiological and meteorological instrumentation readings are used to project dose rates at predetermined distances from the plant, and to determine the integrated dose received. A computerized dose assessment program is used, which utilizes various analysis and sampling methods, including monitored release points, containment leakage/failure, release point samples, and field monitoring team data.

ITAAC 6.1 states, in part, that, using selected monitoring parameters, simulated degraded plant conditions are assessed and protective actions are initiated in accordance with the listed criteria. ITAAC 6.2 states that EIPs provide direction to accurately calculate the source terms and the magnitude of the releases of postulated accident scenario releases. ITAAC 6.3 states that the means exist to continuously assess the impact of the release of radioactive materials to the environment, accounting for the relationship between effluent monitoring readings, and onsite and offsite exposure and contamination for various meteorological conditions.

In ESP Plan Attachments 6 through 9, the applicant stated that the PSEG Site uses the existing SGS/HCGS site's meteorological monitoring program. PSEG has established a meteorological monitoring program that measures wind speed and direction and temperature difference to provide air stability estimates. SSAR Section 2.3.3, "On-Site Meteorological Measurements Program," states that PSEG maintains a backup meteorological tower 118 m (386 ft) south of the primary tower. Primary and backup meteorological information is available in the PSEG Site Control Room, TSC, and EOF. A system to provide alternate remote interrogation of the meteorological system is available by way of direct telephone dial-up capability, and the meteorological monitoring system is provided with a dedicated battery backup power supply. EIPs provide for meteorological support from the closest NOAA National Weather Service station, including monthly communication checks. ITAAC 6.4 states that meteorological data necessary to implement the EIPs is retrievable in the Control Room, TSC, and EOF.

EIPs describe in detail how projected dose calculations are made if radiation monitors normally used for monitoring plant release points or containment radiation are off-scale or inoperable. The procedures call for determining the type of accident and classifying it according to a set of default classes that depend on the reactor technology. ITAAC 6.5 states that the licensee will demonstrate that EIPs provide direction to determine release rate and projected dose rates when instruments are off-scale or inoperable.

The PSEG Site Offsite Dose Calculation Manual summarizes environmental radiological monitoring. Field monitoring within the plume exposure pathway (16-km (10-mi)) EPZ takes place whenever the radiological emergency response organization is fully activated, and field teams take direction from the radiological support personnel in the TSC and/or EOF. Survey-team deployment times range from 30 to 60 minutes, and meteorological information is used to direct onsite and offsite teams. The teams communicate using emergency radios and cellular phones. In RAI 22, Question 13.03-15 [RAI J-5], the staff requested that the applicant provide a map that identifies preselected radiological sampling and monitoring points. In a July 21, 2011, response to RAI 22, Question 13.03-15 [RAI J-5], the applicant stated that this information will be part of the EIPs similar to those that currently exist for the SGS/HCGS site. ESP Plan Attachments 1-1.4 and 1-1.5 list these onsite and EOF EIPs associated with field monitoring:

- PC.EP-EP.ZZ-0310(Q), “Radiation Protection Supervisor – Offsite and Field Monitoring Team Response”
- NC.EP-EP.ZZ-0603(Q), “Field Monitoring”
- NC.EP-EP.ZZ-0604(Q), “Helicopter Plume Tracking”

The staff finds the applicant’s July 21, 2011, response to RAI 22, Question 13.03-15 [RAI J-5] acceptable and, therefore, considers RAI 22, Question 13.03-15 [RAI J-5] resolved. EIPs also describe onsite instrumentation that can be used to initiate emergency measurements, including equipment required for a field survey team. This equipment provides the means to directly measure dose rates, or relate measured field contamination levels to dose rates. Radioactive plume and contamination dose rates are obtained directly from the dose rate meter. PSEG Site survey instruments are able to detect radioiodine concentrations as low as 1×10^{-7} $\mu\text{Ci/cc}$ (microcuries per cubic centimeter), provided that noble gases and background radiation (which can adversely affect the minimum detectable activity) are minimized. ITAAC 6.8 states that a field monitoring team demonstrated, in accordance with the appropriate EPIP(s), the use of sampling and detection equipment for air concentrations in the plume exposure pathway EPZ during a radioactive release scenario as low as 10^{-7} $\mu\text{Ci/cc}$.

Since the Delaware River is not a source of potable water in the vicinity of the PSEG Site, the major critical pathways by which a population would receive a radiation exposure from liquid effluent releases are swimming and boating activities. In the event of a radioactive release to the Delaware River, water samples are taken and counted. ESP Plan Section 3 addresses ERO job description, including those associated with licensee radiological accident assessment and offsite survey teams.

ITAAC 6.6 states that the field monitoring teams were dispatched and able to locate and monitor a radiological release within the plume exposure pathway EPZ during a radioactive release scenario. ITAAC 6.9 states that personnel demonstrated the ability to estimate integrated dose from the dose assessment program and the field monitoring team reading during a radioactive release scenario; the results were successfully compared with the EPA PAGs. ITAAC 6.1.g states that the licensee will demonstrate the ability to develop appropriate protective action recommendations (PARs), and notify appropriate authorities within 15 minutes of development.

In its Interim Finding Report for Reasonable Assurance, FEMA found that the offsite emergency plans are adequate for this planning standard and the associated evaluation criteria in NUREG-0654.

The staff finds that the applicant described and provided adequate facilities, systems, equipment, and means for assessing and monitoring the actual or potential offsite consequences of a radiological emergency condition, including determining the magnitude of, and continually assessing the impact of, the release of radioactive materials. The applicant also described the capability and resources for field monitoring within the 16-km (10-mile) plume exposure pathway EPZ, and has the methods, equipment, and expertise to rapidly assess actual or potential radiological hazards. This includes the capability to detect and measure radioiodine airborne concentrations within the plume exposure pathway EPZ as low as 1×10^{-7} $\mu\text{Ci/cc}$ under field conditions, and to relate the various measured parameters to dose rates for key isotopes and gross radioactivity measurements. In addition, the applicant identified, by position and function to be performed, persons within the licensee organization who will be responsible for making offsite dose projections, and has described how these

projections will be made and the results transmitted to State and local authorities, the NRC, and other appropriate governmental entities.

Conclusion

The staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Planning Standard I. A COL applicant will address COL Action Item 13.3-4. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(9) and 10 CFR Part 50, Appendix E, Sections IV.A.4, IV.B, and IV.E.2, insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations.

13.3.4.3.10 Protective Response

As stated in NUREG-0654, Planning Standard J, "Protective Response," 10 CFR 50.47(b)(10) requires that a range of protective actions have been developed for the plume exposure pathway EPZ for emergency workers and the public. In developing this range of actions, consideration has been given to evacuation, sheltering, and as a supplement to these, the prophylactic use of potassium iodide (KI). ETEs have been developed by applicants and licensees, and licensees shall update the ETEs on a periodic basis. Guidelines for the choice of protective actions during an emergency are developed and in place, and protective actions for the ingestion exposure pathway EPZ appropriate to the locale have been developed. In addition, 10 CFR 50.47(c)(2) and 10 CFR Part 50, Appendix E, Section I require that the size and configuration of the EPZs be determined in relation to local emergency response needs and capabilities, as they are affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries. 10 CFR Part 50, Appendix E, Section IV.I requires the development of a range of protective actions to protect onsite personnel during hostile action to ensure the continued ability of the licensee to safely shut down the reactor and perform the functions of the emergency plan.

In ESP Plan Section 11, "Protective Response," the applicant described the range of protective actions that have been developed for PSEG emergency workers and the general public in the plume exposure pathway EPZ. The staff reviewed this section, as well as other relevant portions of the application, to determine whether the application conforms to the applicable guidance and complies with the pertinent regulatory requirements. The staff's primary focus was to evaluate the emergency plan against NUREG-0654, Planning Standard J, which provides the detailed evaluation criteria that the staff should consider to determine whether the emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(10).

SSAR Section 13.3, "Emergency Plan," states that the existing EPZs for the SGS/HCGS site are used for the proposed new plant at the PSEG Site, which are based on the requirements in 10 CFR Part 50, Appendix E. As such, the size and configuration of the existing EPZs for the SGS/HCGS site were determined in relation to local emergency response needs and capabilities, as they are affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries. ESP Plan Section 1 describes the plume exposure pathway EPZ and the ingestion exposure pathway EPZ, which are illustrated in Figures 1-3 and 1-4, respectively. The EPZs are the areas for which planning is performed to assure that prompt effective actions can be taken to protect the public in the event of an accident.

The plume exposure pathway EPZ is an area surrounding the plant out to a radius of approximately 16 km (10 mi), including portions of Salem and Cumberland Counties in New Jersey and New Castle and Kent Counties in Delaware. (See ESP Plan Attachment 11 regarding the ETE for evacuation of the 16-km (10-mi) EPZ, which is addressed in Sections 13.3.4.1 and 13.3.4.3.17 of this report.) The principal exposure sources from this pathway are whole body external exposure to gamma radiation from the plume and from deposited material, and inhalation exposure from the passing radioactive plume. The ingestion exposure pathway (80-km (50-mi)) EPZ is an area surrounding the plant out to a radius of approximately 80 km (50 mi). The principal exposure from this pathway is the ingestion of contaminated milk. The planning effort for this pathway involves the identification of potential sources of contaminated milk and associated control points and mechanisms that prevent it from entering the human food chain. Ingestion pathway exposures in general would represent a problem in the days or weeks after an accident, although some early protective actions to minimize subsequent contamination of milk are provided in the State plans.

The staff finds it appropriate (and necessary) for the PSEG Site to use the existing SGS/HCGS site EPZs, because of the location of the proposed new plant, and also because the size and configuration of the EPZs depend on the local (offsite) emergency response needs rather than the number of reactors on the combined and contiguous SGS/HCGS site and the PSEG Site.

ESP Plan Section 11 states that in the event of an emergency at the PSEG Site, methods are established for notifying personnel within the Protected Area and Owner Controlled Area. The primary means of notification within the onsite Protected Area are the plant's public address system and evacuation alarms (described in ESP Plan Section 7, and discussed in Section 13.3.4.3.6 of this report). Announcements include the emergency classification and response actions to be taken by onsite personnel. PSEG maintains the ability to notify all individuals within the Protected Area, including high-noise areas and outbuildings. The SGS/HCGS site currently employs an onsite siren system to notify workers outside the Protected Area of the need to evacuate, and this system will be used for the PSEG Site. Individuals located outside the Protected Area, but inside the Owner Controlled Area, are informed by an onsite siren system. Other notification methods include public-address system announcements and security force activities (e.g., vehicle-mounted public-address systems).

In RAI 22, for the PSEG site ESP (ADAMS Accession No. ML11157A129), with Question 13.03-15 [RAI J-1], the staff requested that the applicant describe the time to warn or advise onsite individuals and individuals who may be in areas controlled by the operator. In a July 21, 2011, response to RAI 22, Question 13.03-15 [J-1], the applicant stated that the information will be provided in EPIPs similar to those that currently exist for the SGS/HCGS site (e.g., NC.EP-EP.ZZ-0102). ESP Plan Attachment 1-1.7 also lists EPIP NC.EP-EP.ZZ-0902(Q), "Accountability/Evacuation." ITAAC 7.1 states that a test will be performed of the capabilities to warn and advise onsite individuals of an emergency, including those in the Owner Controlled Area and the immediate vicinity. The staff finds the applicant's response to RAI 22, Question 13.03-15 [RAI J-1], acceptable and, therefore, considers RAI 22, Question 13.03-15 [RAI J-1] resolved.

ESP Plan Section 11.1.2, "Assembly and Accountability," states that initial personnel accountability is completed 30 minutes after the accountability message has been announced over the station page, and includes all personnel who remain within the Protected Area. The accountability system is based in the security computer, which maintains normal logs of personnel entering and exiting the Protected Area, and uses the photo badge issued to each

person who accesses the site. After accountability is initiated, personnel pass their photo badge through dedicated accountability card readers installed at the various accountability stations. The security computer generates a report for the security supervisors, which indicates the names of unaccounted-for personnel, and the Shift Manager/Emergency Duty Officer is informed of the accountability results. Actions are taken to locate any missing persons, including use of search and rescue teams, if appropriate. ITAAC 8.1.1.C.4 states that during the full participation exercise, the licensee will demonstrate the ability to perform assembly and accountability for all personnel in the Protected Area within 30 minutes after the accountability message has been announced.

ESP Plan Section 11.1.3, "Protective Actions," states that, once personnel accountability has been performed, specific instructions on appropriate protective actions to be taken by station personnel are issued over a public address system. Evacuation and sheltering options are combined with a consideration of the necessity for keeping specific technical or management personnel at the station for emergency plan implementation. Evacuation routes and transportation for nonessential onsite personnel are part of the evacuation study (i.e., the ETE) for the entire area around the PSEG Site, which is provided in ESP Plan Attachment 11. In addition, ETE Sections 3.3 and 3.6 address employees who work within the 16-km (10-mi) EPZ, which includes nonessential onsite personnel. The ETE also includes maps showing population distribution around the PSEG Site, evacuation areas and routes, and relocation centers. (The ETE is discussed in Section 13.3.4.3.17 of this report.)

ESP Plan Section 11.1.3 further states that evacuations are performed using the site evacuation procedures, which provide guidance to the Emergency Coordinator and security force on actions required for site evacuation. The access road to the PSEG Site is currently the only route to evacuate the site, although a proposed causeway might be available for use as an alternate route (see Proposed Plant Access Road shown on ESP Plan Section 1, Figures 1-1, 1-2, and 1-3). Affected individuals evacuate the site using personal vehicles. Persons without transportation are identified and provided transportation, as necessary. Appropriate sheltering is available if circumstances preclude evacuation of personnel by the access road. ESP Plan Section 11.2.0, "Personnel Monitoring and Decontamination," states that for individuals remaining or arriving onsite during the emergency, respiratory protection, protective clothing, and thyroid-protecting drug KI are available. In RAI 22, Question 13.03-15 [RAI J-2], the staff requested that the applicant describe alternatives to the site access road that might be implemented in adverse weather conditions or when specific radiological conditions impact the evacuation route. In a July 21, 2011, response to RAI 22, Question 13.03-15 [RAI J-2], the applicant stated that alternatives to evacuation will be in EIPs similar to those that currently exist for the SGS/HCGS site.

Pursuant to 10 CFR 52.39(b), an applicant for a COL that references this ESP shall update the emergency preparedness information that was provided under 10 CFR 52.17(b), and discuss whether the updated information materially changes the bases for compliance with applicable NRC requirements. As such, the staff identified the following COL action item to address the availability of a proposed causeway for use as an alternate site evacuation route.

COL Action Item 13.3-5

An applicant for a COL or CP referencing this early site permit should revise the emergency plan to describe the availability of a proposed causeway for use as an alternate route for evacuating the site. If appropriate, the applicant should update the

evacuation time estimate (ETE) analysis for the PSEG Site to reflect the causeway, and provide confirmation that the ETE update was provided to State and local governmental authorities for use in developing offsite protective action strategies.

The staff finds the applicant's July 21, 2011, response to RAI 22, Question 13.03-15 [RAI J-2], acceptable because the existing alternative to evacuation for the SGS/HCGS site are acceptable. Therefore, the staff considers RAI 22, Question 13.03-15 [RAI J-2], resolved.

With regard to a hostile action against the site, ESP Plan Section 11.1.2, "Assembly and Accountability," states that site protective actions during security-related events are taken in accordance with station abnormal operating procedures that deal with airborne threats and security events, and take priority ahead of the normal assembly/accountability process, as outlined in NRC Bulletin 2005-02. (See typical security procedures listed in ESP Plan Attachment 1-1.7.)

In addition, in an August 29, 2012, letter to the NRC, PSEG described the implementation approach for the 11 amendments (enhancements) to the emergency preparedness regulations in the Final Rule. With regard to the requirement in 10 CFR Part 50, Appendix E, Section IV.I for the development of a range of protective actions to protect onsite personnel during hostile action, the applicant identified the relevant language in ESP Plan Section 11.1.2 (discussed above), and added that "[a]dditional detail related to onsite protective actions for site personnel will be contained in site-specific Operations or Emergency Plan implementing procedures" (see ITAAC 9.1). ITAAC 8.1.1.D.2 also addresses (in part) demonstrating the adequacy of security provisions for the emergency response facilities (i.e., TSC, OSC, EOF, and ENC/JIC) during a full participation exercise.

Monitoring and decontamination of personnel is performed on individuals who have potentially been exposed to or come in contact with radioactive materials, and is performed onsite in the decontamination area at each Control Point or other suitable location within the controlled access areas of the station. Should an actual release of radioactive material occur, the source, wind direction, and survey results are used to determine whether general monitoring of station personnel is required. If general monitoring of personnel is determined to be required, the monitoring and decontamination are performed in accordance with EIPs. The EOF serves as an offsite assembly area, and has facilities for personnel monitoring and decontamination. Methods of personnel decontamination are described in ESP Plan Section 12 and discussed below in Section 13.3.4.3.11 of this report.

With regard to offsite protective response, ESP Plan Section 11.3 states that the States of New Jersey and Delaware use similar bases for recommending protective actions within the 16-km (10-mi) EPZ. Consistent with action levels indicated in both State plans, which are adopted from EPA 400-R-92-001, PSEG determines what protective action, if any, should be recommended to the States. For a projected total effective dose equivalent (TEDE) plus 4-day dose of 1 rem (0.01 sievert) and thyroid committed dose equivalent (CDE) of 5 rem (0.05 sievert), PSEG may recommend that the affected population either seek shelter or evacuate, or a combination of both, depending on the distance and direction of the radioactive plume. The decision is based primarily on a comparison of the projected plume travel time, evacuation time estimates, ambient meteorology, anticipated duration of release, and degree of protection afforded by local residential units. ESP Plan Table 11-1 lists representative shielding factors provided by typical structures against direct exposure to the plume. If an evacuation can be completed before the plume passes over the affected population, an evacuation

recommendation may be made. A sheltering recommendation may be made if a “puff” radiological release occurs and it is not expected that evacuation can be completed before the plume reaches the affected population.

In its Interim Finding Report for Reasonable Assurance, FEMA found that the offsite emergency plans are adequate for this planning standard and the associated evaluation criteria in NUREG-0654.

The staff finds that the applicant developed a range of protective actions for the (16-km (10-mi)) plume exposure pathway EPZ for emergency workers and the public, including consideration of evacuation, sheltering, and the prophylactic use of KI. The staff finds that the applicant has developed guidelines for the choice of protective actions during an emergency that are consistent with Federal guidance, including protective actions for the (80-km (50-mi)) ingestion exposure pathway EPZ that are appropriate to the locale. The size and configuration of the EPZs have been determined in relation to local emergency response needs and capabilities, as they are affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries. In addition, the staff finds that the applicant has developed a range of protective actions to protect onsite personnel during hostile action. Development of ETEs is addressed in Section 13.3.4.3.17 of this report.

Conclusion

The staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Planning Standard J. A COL applicant will address COL Action Item 13.3-5. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(10), 10 CFR 50.47(c)(2), and 10 CFR Part 50, Appendix E, Sections I and IV.I, insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations.

13.3.4.3.11 Radiological Exposure Control

As stated in NUREG-0654, Planning Standard K, “Radiological Exposure Control,” 10 CFR 50.47(b)(11) requires that the means for controlling radiological exposures in an emergency be established for emergency workers. The means for controlling radiological exposures shall include exposure guidelines consistent with the EPA “Manual of Protective Action Guides and Protective Actions for Nuclear Incidents,” EPA 400-R-92-001, May 1992. In addition, 10 CFR Part 50, Appendix E, Section IV.E.3 requires that adequate provisions shall be made and described for emergency facilities and equipment, including facilities and supplies at the site for decontamination of onsite individuals.

In ESP Plan Section 12, “Radiological Exposure Control,” the applicant described the means to control emergency workers’ radiological exposures during an emergency, including measures to provide assistance to persons injured by or exposed to radioactive materials. The staff reviewed this section, as well as other relevant portions of the application, to determine whether the application conforms to the applicable guidance and complies with the pertinent regulatory requirements. The staff’s primary focus was to evaluate the emergency plan against NUREG-0654, Planning Standard K, which provides the detailed evaluation criteria that the staff should consider to determine whether the emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(11).

Onsite exposure guidelines are provided in EIPs, which include site evacuation criteria, protective action recommendation guidance, exposure limits for emergency workers, and decontamination guidance. The radiation protection program has a goal of positive control of personnel exposure to radiation and radioactive material, and provides these emergency capabilities:

- 24-hour-per-day dose determination recording and record retention
- contamination control
- onsite and offsite decontamination of site personnel
- respiratory protection
- lifesaving dose risk assessment

The Radiation Protection Department is responsible for ensuring that internal and external radiation exposure at the worksite is kept as low as reasonably achievable (ALARA); this department will implement the dose determination capability for emergency personnel (including distribution of dosimeters and maintenance of dose records) and make available additional dosimetry to support additional personnel arriving onsite. ESP Plan Table 9-1 lists typical radiological protection emergency equipment available onsite and offsite. If it becomes necessary to evacuate during an emergency, necessary dosimetry equipment may be relocated to lower dose areas so that it remains available for exposure evaluation. ITAAC 8.1.1.E.2.b states that, during a full participation exercise, exposure records are available from the site database (primary), a personal computer database (backup), or a hard copy report (backup).

EIPs address radiological exposure control, including any emergency exposures (i.e., planned exposures greater than regulatory limit in 10 CFR Part 20). Emergency exposures require approval by the Emergency Duty Officer. If the Emergency Duty Officer is not available, the Shift Manager, with advice from the Shift Radiation Protection Technician, makes the authorization decision. The upper limit for performing actions to save station equipment that is required to mitigate the emergency is 25 rems (0.25 sievert) and the upper limit for lifesaving actions is 75 rems (0.75 sievert). Lifesaving activities can include performing assessment or corrective actions, removing injured persons, providing first aid and medical treatment, performing personnel decontamination, and providing ambulance service. ITAAC 8.1.1.E.2.a states that, during a full participation exercise, emergency workers are issued self-reading dosimeters when radiation levels require, and exposures are controlled to 10 CFR Part 20 limits (unless emergency limits are authorized). The staff finds these dose guidelines for emergency workers consistent with EPA 400-R-92-001, Table 2-2, "Guidance on Dose Limits for Workers Performing Emergency Services."

Decontamination of personnel and vehicles is performed in accordance with EIPs and/or Station Radiation Protection Procedures. ESP Plan Table 12-1 lists acceptable surface contamination levels, which are used as a guide for the release of equipment. ESP Plan Table 12-2 provides general guidance for the decontamination of personnel. The release of station personnel is performed using normal station operational limits, as incorporated into EIPs, and the release values may be increased at the discretion of the Radiological Assessment Coordinator or Emergency Duty Officer. PSEG has established procedures for decontamination of relocated onsite personnel, including provisions for extra clothing and decontaminants. Relocated onsite personnel can be decontaminated at the Control Point or at the EOF, which serves as an offsite assembly area and has facilities for personnel monitoring and decontamination. Once evacuated from the Owner Controlled Area, non-emergency PSEG workers will normally be treated the same way as the general public where decontamination

processes are concerned; monitoring of personnel and vehicles will be performed by offsite officials at an appropriate reception center.

ESP Plan Attachments 6 through 9 each has a Section 1.e that describes decontamination facilities for one of the four proposed reactor technologies (AP1000, ABWR, US-APWR, and U.S. EPR, respectively). Except for the US-APWR, for which the DCD does not include a decontamination facility as part of the standard design, the location of the onsite personnel decontamination facility is identified. For the US-APWR, the applicant stated that the location of the decontamination facility will be determined at a later date. All four attachments state that the decontamination facility contains provisions for radiological decontamination of personnel, their wounds, supplies, instruments and equipment, and also contains extra clothing and decontaminants.

Pursuant to 10 CFR 52.39(b), an applicant for a COL that references this ESP shall update the emergency preparedness information that was provided under 10 CFR 52.17(b), and discuss whether the updated information materially changes the bases for compliance with applicable NRC requirements. As such, the staff identified the following COL action item to address the selection of the location of the decontamination facility for the US-APWR reactor technology.

COL Action Item 13.3-6

An applicant for a COL or CP referencing this early site permit and the US-APWR design control document (DCD) should revise the emergency plan to identify the location of an onsite personnel decontamination facility.

PSEG maintains access control to the controlled areas of the station and assigns personnel to monitor anyone entering and leaving the controlled-access areas. Criteria for permitting the return of areas and items to normal use are established, with restoration levels and personnel exposure not exceeding 10 CFR Part 20 limits. Release values may be increased at the discretion of the Radiological Assessment Coordinator or Emergency Duty Officer. ESP Plan Table 12-1 is used as a guide for equipment release listing levels for loose contamination and combined (loose and fixed) contamination for gross beta/gamma and for gross alpha. Onsite drinking facilities with local groundwater as their source are considered contaminated until sampled and bottled drinking water and food supplies are shipped to the site from outside vendors.

In its Interim Finding Report for Reasonable Assurance, FEMA found that the offsite emergency plans are adequate for this planning standard and the associated evaluation criteria in NUREG-0654.

The staff finds that the applicant has established the means to control radiological exposures for emergency workers in a way consistent with the exposure guidelines in EPA 400-R-92-001. In addition, the applicant made and described adequate provisions for emergency facilities and equipment, including facilities and supplies for monitoring and decontamination of onsite and relocated personnel, vehicles, and other affected materials, and has established appropriate contamination control measures.

Conclusion

The staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Planning Standard K. A COL applicant will address COL Action Item 13.3-6.

Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(11) and 10 CFR Part 50, Appendix E, Section IV.E.3, insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations.

13.3.4.3.12 Medical and Public Health Support

As stated in NUREG-0654, Planning Standard L, “Medical and Public Health Support,” 10 CFR 50.47(b)(12) requires that arrangements be made for medical services for contaminated injured individuals. In addition, 10 CFR Part 50, Appendix E, Section IV.E requires facilities and medical supplies at the site for appropriate emergency first aid treatment, and arrangements for medical service providers qualified to handle radiation emergencies onsite. Arrangements are also required for transportation of contaminated injured individuals from the site to specifically identified treatment facilities outside the site boundary.

In ESP Plan Section 13, “Medical Support,” the applicant described the arrangements for medical services for contaminated injured personnel at the PSEG Site. The staff reviewed this section, as well as other relevant portions of the application, to determine whether the application conforms to the applicable guidance and complies with the pertinent regulatory requirements. The staff’s primary focus was to evaluate the emergency plan against NUREG-0654, Planning Standard L, which provides the detailed evaluation criteria that the staff should consider to determine whether the emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(12).

The Memorial Hospital of Salem County (MHSC) provides emergency medical support and has agreed to accept contaminated patients for emergency medical and surgical treatment on a 24-hour basis. ESP Plan Attachment 3, “Memoranda of Understanding,” provides a memorandum of understanding between PSEG and MHSC. MHSC is located near Salem, NJ, and all nuclear station and local ambulance drivers and support personnel are familiar with directions to the hospital. To handle contaminated patients safely without disturbing other hospital operations, MHSC has a designated Radiation Emergency Area. In addition, procedures for implementing the hospital’s radiological medical emergency preparedness plan have been prepared and are known to the hospital personnel responsible for handling the treatment of radiological accident victims. Equipment and supplies are maintained at MHSC, and PSEG performs maintenance of the hospital’s emergency preparedness plan and the equipment required to support the plan, including calibration of the radiological survey equipment.

The primary backup for MHSC is Southern Ocean County Hospital. If additional support is needed, both Christiana and Wilmington Hospitals in Delaware are capable of providing backup medical treatment of radioactively contaminated patients. In addition, an Emergency Medical Assistance Program is in effect with Radiation Emergency Assistance Center/Training Site (REAC/TS),⁵ which provides backup medical treatment of radioactively contaminated patients.

⁵ U.S. Department of Energy REAC/TS staff is available 24 hours a day, 7 days a week, to deploy and provide emergency medical consultation for incidents involving radiation anywhere in the world. REAC/TS provides direct support for the National Nuclear Security Administration’s Office of Emergency Response and the Federal Radiological Monitoring and Assessment Center (FRMAC). Source: <http://orise.orau.gov/reacts/>, visited May 3, 2012.

In RAI 22, Question 13.03-16, the staff requested that the applicant provide additional information regarding onsite access for physicians and other medical personnel that are qualified to handle radiation emergencies onsite. In a July 21, 2011, response to RAI 22, Question 13.03-16, the applicant stated that arrangements for the services of physicians and other medical personnel qualified to handle radiation emergencies onsite are discussed in ESP Plan Section 13.1.1, "Normal Operations – Onsite Medical Support," and will be part of the onsite Emergency Medical Team and Fire Brigade procedures, similar to those for SGS and HCGS (e.g., PSEG procedure SH.FP-EO.ZZ-0004, "Fire Department Medical Emergency Response")

ESP Plan Section 13 further states that the PSEG ambulance provides the equipment and capability to safely transport injured and/or contaminated personnel to an offsite medical facility. This ambulance is operated by members of the fire department who provide first aid during transport. A member of the station's radiation protection staff accompanies the patient to provide health physics coverage if required. Local ambulance squads provide secondary first aid and transportation support to the site. As indicated in the New Jersey Radiological Emergency Response Plans for Salem County and its municipalities, the Salem County Office of Emergency Services is responsible for the overall coordination of emergency medical units. ESP Plan Attachment 3 includes a memorandum of understanding between PSEG and the Salem County Department of Emergency Services, which states that Salem County shall provide notification to the Salem County Emergency Ambulance units to assist and cooperate with the PSEG Nuclear Emergency Medical Response units. The staff finds the applicant's July 21, 2011, response to RAI 22, Question 13.03-16, acceptable because the applicant has provided for onsite first aid capability. Accordingly, the staff considers RAI 22, Question 13.03-16, resolved.

The primary communication link between the onsite and offsite organizations responsible for medical support is by commercial telephone, and the telephone numbers are listed in the Emergency Telephone List. Communications directing or requesting an ambulance are made to the organization responsible for the ambulance, which maintains communications with the ambulance.

In its Interim Finding Report for Reasonable Assurance, FEMA found that the offsite emergency plans are adequate for this planning standard and the associated evaluation criteria in NUREG-0654.

The staff reviewed the memoranda of understanding for the medical service providers described above and the additional information provided in ESP Plan Section 13. The staff finds that the applicant has made arrangements for hospital and medical service providers that have the capability to evaluate radiation exposure and uptake, and persons providing these services are adequately prepared to handle contaminated individuals. In addition, the applicant provided for appropriate emergency first aid treatment at the site, including qualified medical personnel to handle radiation emergencies, and arrangements for transporting victims of radiological accidents (i.e., contaminated injured individuals) to offsite medical support facilities.

Conclusion

The staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Planning Standard L. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(12) and 10 CFR Part 50,

Appendix E, Section IV.E, insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations.

13.3.4.3.13 Recovery and Reentry Planning and Post-Accident Operations

As stated in NUREG-0654, Planning Standard M, "Recovery and Reentry Planning and Post-Accident Operations," 10 CFR 50.47(b)(13) requires that general plans for recovery and reentry be developed. In addition, 10 CFR Part 50, Appendix E, Section IV.H requires a description of criteria to be used to determine when, following an accident, reentry of the facility would be appropriate or when operation could be resumed.

In ESP Plan Section 14, "Recovery and Reentry Planning," the applicant described activities for reentry into the areas of the plant that have been evacuated as a result of an accident, as well as the recovery organization and its concepts of operation. The staff reviewed this section, as well as other relevant portions, to determine whether the application conforms to the applicable guidance and complies with the pertinent regulatory requirements. The staff's primary focus was to evaluate the emergency plan against NUREG-0654, Planning Standard M, which provides the detailed evaluation criteria that the staff should consider to determine whether the emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(13).

Termination of an emergency and entry into recovery are determined based on the applicability of EALs in the Event Classification Guide (ECG) and consideration of various guidelines (described below). Reduction of an emergency classification level is based on improving conditions and the selection of the appropriate EAL in the ECG. ESP Plan Section 14.2.0, "Initiation of Recovery Operations," states that the Emergency Coordinator determines if the emergency is under control prior to securing the emergency response and entering into recovery operations. Termination of the emergency and entry into recovery may be considered when these guidelines are met.

- Full-time operations of emergency response facilities may be curtailed.
- Radiation levels in all areas are either stable or decreasing with time.
- Releases of radioactive materials to the environment from the plant are within allowable Federal limits.
- Fire, flooding, or similar emergencies no longer present an emergency situation to plant operation.
- The plant is in a safe status and further degradation of a safety system is not expected.

ESP Plan Section 14.3.0, "Recovery Operations," states that recovery operations will be under the direction of the Emergency Coordinator, and that entry into recovery operations for an alert or higher classification requires the concurrence of the Station Vice President (or, in his absence, the President and Chief Nuclear Officer PSEG Nuclear, or designee). Recovery operations consist of an orderly evaluation of the causes and effects of the emergency, measures necessary to place the plant back into operation, an analysis of exposure records, assembling of a Recovery Management Organization to implement Recovery Operations, coordination of additional assistance to offsite organizations, and reentry. The extent of these efforts will depend on the nature of the incident and its effect on plant systems.

Upon reduction of the emergency classification, the Emergency Coordinator may modify the emergency response organization, and will notify key emergency response managers and supervisors of the initiation of recovery actions through established communications methods, in accordance with EPIPs. ESP Plan Attachment 1-1.5 lists EOF EPIP NC.EP-EP.ZZ-0405(Q), "Emergency Termination/Reduction/Recovery." All recovery operations that may have offsite consequences will be coordinated with appropriate offsite agencies, and the Emergency Coordinator will also notify State and local support agencies of the initiation of recovery action. (Emergency Coordinator responsibilities are also addressed in ESP Plan Sections 2, 3, and 4, and discussed in Sections 13.3.4.3.1, 13.3.4.3.2, and 13.3.4.3.3 of this report, respectively.)

ESP Plan Section 14.4.0, "Reentry," discusses the various concepts of reentry associated with onsite recovery. Reentry consists of planned and deliberate access to areas of the plant that were evacuated, or were controlled as limited-access areas, as the result of an emergency. The Radiological Assessment Coordinator or Radiological Support Manager determines what is needed to reenter affected areas. Reentry activities may occur before the termination of the emergency, or they may be conducted as a part of recovery operations, and do not include the initial corrective or protective actions taken to establish control of the emergency. The primary function of reentry is to perform comprehensive radiological surveys of the plant or assessment of damaged plant equipment in order to establish detailed recovery plans. Planning considerations associated with reentry include contamination and ALARA controls, radiation dose rates and dose limits, decontamination requirements, posting of radiological areas, and site access. Offsite reentry activities are the responsibility of State and local authorities, in accordance with their plans and procedures.

In RAI 22, Question 13.03-17, the staff requested that the applicant provide information regarding the method used to periodically estimate total population exposure. In a July 21, 2011, response to RAI 22, Question 13.03-17, the applicant stated that atmospheric transport and diffusion for the new plant will be calculated using an approved dose assessment tool, and that a method for determining atmospheric transport and diffusion throughout the plume exposure EPZ during emergency conditions will be developed following the selection of a reactor technology. Pursuant to 10 CFR 52.39(b), an applicant for a COL that references this ESP shall update the emergency preparedness information that was provided under 10 CFR 52.17(b), and discuss whether the updated information materially changes the bases for compliance with applicable NRC requirements. As such, the staff identified the following COL action item to address the development of a method for determining atmospheric transport and diffusion.

COL Action Item 13.3-7

An applicant for a COL or CP referencing this early site permit should revise the emergency plan to describe the method for determining atmospheric transport and diffusion throughout the 10-mile plume exposure emergency planning zone during emergency conditions, including the ability to periodically estimate total population exposure.

As described above, the staff finds the applicant's July 21, 2011, response to RAI 22, Question 13.03-17, acceptable and, therefore, considers RAI 22, Question 13.03-17, resolved.

In its Interim Finding Report for Reasonable Assurance, FEMA found that the offsite emergency plans are adequate for this planning standard and the associated evaluation criteria in NUREG-0654.

The staff finds that the applicant has developed general plans for recovery and reentry, including describing criteria to be used to determine when, following an accident, reentry of the facility is appropriate or operation can be resumed. In addition, the applicant designated the individuals who will fill key positions in the facility recovery organization. The staff finds that the plans adequately specify the means for informing members of the response organizations that a recovery operation is to be initiated, describe how decisions to relax protective measures are made, and include a method for periodically estimating total population exposure.

Conclusion

The staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Planning Standard M. A COL applicant will address COL Action Item 13.3-7. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(13) and 10 CFR Part 50, Appendix E, Section IV.H, insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations.

13.3.4.3.14 Exercises and Drills

As stated in NUREG-0654, Planning Standard N, "Exercises and Drills," 10 CFR 50.47(b)(14) requires that periodic exercises be conducted to evaluate major portions of emergency response capabilities, periodic drills be conducted to develop and maintain key skills, and deficiencies identified as a result of exercises or drills be corrected. In addition, 10 CFR Part 50, Appendix E, Section IV.F requires a description of the program that provides for training of employees, exercising by periodic drills, and participation by other assisting persons. The exercises – including hostile action exercises of the onsite and offsite emergency plans – shall test the adequacy of timing and content of implementing procedures and methods, test emergency equipment and communications networks, test the public alert and notification system, and ensure that emergency organization personnel are familiar with their duties. 10 CFR Part 50, Appendix E, Section IV.F further describes the full participation exercise (including timing), participation by each offsite authority having a role under the radiological response plan, deficiencies identified during the exercise, remedial exercises, exercise scenarios, and 8-year exercise cycle.

In ESP Plan Section 15, "Exercises and Drills," the applicant described the program for drills and exercises conducted to practice, test, and evaluate the adequacy of the emergency preparedness program, including facilities, equipment, procedures, communication links, actions of ERO personnel, and coordination between PSEG and offsite EROs. The staff reviewed this section, as well as other relevant portions of the application, to determine whether the application conforms to the applicable guidance and complies with the pertinent regulatory requirements. The staff's primary focus was to evaluate the emergency plan against NUREG-0654, Planning Standard N, which provides the detailed evaluation criteria that the staff should consider to determine whether the emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(14).

An exercise tests the ability of personnel to assess simulated plant conditions and take appropriate actions. Actions are taken in accordance with the emergency plan and associated procedures and include such activities as staff notification and activation of emergency response facilities; conducting technical evaluation of plant condition and radiological surveys and assessment; notification, communication, and coordination with offsite response organizations (including providing protective action recommendations); and managing recovery

activities. Personnel training is addressed in ESP Plan Section 16 and discussed in Section 13.3.4.3.15 of this report.

Exercises are conducted in accordance with an exercise manual, and include (at a minimum) the elements listed in ESP Plan Section 15.1.2. These include such elements as exercise objectives, participating agencies, exercise conduct guidelines, operational and radiological data (including field radiation data), simulated events/action, and evaluation criteria. PSEG limits the scope and timing of the distribution of the exercise manual to protect the confidentiality of the exercise scenario. The exercise scenario is varied from year to year, so that all major elements of the plans and preparedness organizations are tested within a 6-year period. In addition, exercises are conducted under various weather conditions and once every 6 years start between 6:00 p.m. and 4:00 a.m. Federal observers/evaluators or drill referees/observers will evaluate the adequacy of the emergency response demonstrated for the exercise objectives.

In an August 29, 2012, letter to the NRC, PSEG described the implementation approach for the eleven amendments (enhancements) to the emergency preparedness regulations addressed in the Final Rule. With regard to drills and exercises, the applicant stated that the rule adds several requirements for exercises, including a hostile action based (HAB) exercise, 8-year exercise cycle, and NRC review of exercise scenarios. In addition, when PSEG selects a reactor technology and submits a COL application to the NRC, the COL application will include an ITAAC to submit EIPs to the NRC 180 days prior to fuel load, and the EIPs will require submittal of the exercise scenario to the NRC and conformance with the 8-year cycle scenario requirement.

In a December 18, 2013, letter to NRC, PSEG supplemented its August 29, 2012, response with regard to the conduct of HAB drills and the 8-year exercise drills. Specifically, PSEG committed to revise Section 15, "Exercises and Drills," of the ESP Plan (in a future revision of the ESPA) by changing the drill cycle duration from six to eight years, and adding a requirement to conduct a HAB drill once during each eight year drill cycle. The staff reviewed the proposed revisions, and found them acceptable because they are consistent with 10 CFR Part 50, Appendix E, Section IV.F.2.i. Therefore, the staff identified these changes to the ESP Plan as Confirmatory Item 13.3-1. The staff verified that in Revision 4 to the PSEG Site ESP application (June 5, 2015), the applicant incorporated the committed changes. Therefore, the staff considers Confirmatory Item 13.3-1 closed.

Following an exercise, a critique is scheduled to evaluate the ability of the participants to respond to an emergency in accordance with the plan and procedures and to identify any deficiencies in training, facilities, equipment, or procedures. ITAAC 8.1.1.G.1 addresses the licensee conducting a post-exercise critique to determine areas requiring improvement and corrective action. The Manager – Emergency Preparedness reviews the deficiencies and ensures corrective actions are assigned appropriately, and NRC-evaluated exercise critiques are provided to senior management. Corrective actions are tracked for timely resolution or escalated to higher levels of management for action.

ITAAC 8.1 states that a full participation exercise (test) will be conducted within the specified time periods of 10 CFR Part 50, Appendix E, and ITAAC 8.1.1 lists onsite exercise objectives. In addition, ITAAC 8.1.2 addresses onsite personnel mobilization and performance of assigned responsibilities.

In addition to the exercises, the PSEG Site conducts drills for the purpose of testing, developing, and maintaining the proficiency of emergency responders. A drill is a supervised instruction

period used to develop and maintain skills in a particular operation. Drills are a training tool to develop and maintain the emergency response organization. ESP Plan Table 15-1 provides the schedule of exercises and drills, including participation of the various State and Federal response organizations. At a minimum, these activities will be conducted.

- **Communication Drills**—The monthly communications drill consists of a test of the primary and/or secondary communications links between the Control Rooms, TSCs and EOF, and the appropriate initial State and local government contact points. A communications drill to NRC Headquarters and the NRC Regional Office Operations Center from the Control Rooms, TSCs, and EOF is completed monthly. The quarterly communications drill consists of a test of the primary and/or secondary communications links between the Control Rooms, TSCs, and EOF and the appropriate Federal EROs and States within the ingestion pathway contact points. Annual communications drills test communications equipment used for notifications of Federal EROs and for communication among the nuclear facility, State and local EOCs, and field assessment teams.
- **Notifications**—The quarterly pager test consists of a test of the primary and/or secondary communications links between the callout computer and PSEG ERO members that carry pager.
- **Fire Drills**—Fire drills are performed at predetermined intervals, not to exceed three months, in accordance with the fire protection program.
- **Medical Emergency Drills**—The annual medical emergency drill consists of appropriate treatment of simulated contaminated person(s), use of appropriate contamination control measures, and transportation to the local medical facility by the station ambulance. The offsite portions of the medical drill may be performed as part of the required annual exercise.
- **Radiological Monitoring Drills**--The annual radiological monitoring drill consists of onsite and offsite surveys (to include environmental samples) and assessment of simulated survey results by the appropriate members of the ERO.
- **Radiation Protection Drills**--The semiannual radiation drill demonstrates the response of radiation protection personnel to simulated elevated radiation levels in airborne and liquid samples. It also simulates direct reading of radiation measurements in the environment.
- **Accountability Drills**—The annual accountability drill demonstrates the ability of personnel to report to their accountability stations and the accounting of Protected Area personnel during a simulated emergency. Additionally, security force personnel ensure that the accessible areas of the exclusion zone are simulated to be cleared of contractor personnel and/or members of the general public. A full accountability drill involves participation of all Protected Area personnel and shall be conducted at least once every 6 years.
- **Augmentation Drills**—Augmentation drills serve to demonstrate the capability of the process to augment the on-shift staff with a TSC, OSC, EOF, and ENC/JIC after declaration of an emergency. An unannounced augmentation drill shall be performed at least once every 6 years.

- EOF Consolidated Functions Drill—An EOF consolidated functions drill will demonstrate the capability of the EOF to support multiple units in an emergency, and shall be performed at least once every 6 years.

In its December 18, 2013, letter (discussed above), PSEG's commitment to revise Section 15 of the ESP Plan includes changing the above 6-year drill frequencies to eight years. These changes were included in Confirmatory Item 13.3-1, which has been closed (See earlier in this Section).

In its Interim Finding Report for Reasonable Assurance, FEMA found that the offsite emergency plans are adequate for this planning standard and the associated evaluation criteria in NUREG-0654. In addition, FEMA stated that the adequacy of the PSEG Plan for offsite response organizations is also dependent on satisfactory demonstration of plan implementation during a joint exercise with the licensee and State and local governments, utilizing PSEG facilities. ITAAC 8.1.3 addresses offsite exercise objectives and the absence of uncorrected offsite exercise deficiencies prior to (reactor) operation above 5 percent of rated thermal power.

Consistent with the resolution of Confirmatory Item 13.3-1, the staff finds that the applicant has described provisions for conducting periodic exercises and drills to evaluate major portions of emergency response capabilities and to develop and maintain key skills. The exercises will test the adequacy of implementing procedures, emergency equipment and communications networks, and the public notification system, and will ensure that the ERO personnel are familiar with their duties. In addition, the staff finds that the applicant described the full participation exercise, participation by offsite authorities, and how exercise and drill deficiencies will be identified and corrected.

Conclusion

Consistent with the resolution of Confirmatory Item 13.3-1, the staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Planning Standard N. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(14) and 10 CFR Part 50, Appendix E, Section IV.F, insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations.

13.3.4.3.15 Radiological Emergency-Response Training

As stated in NUREG-0654, Planning Standard O, "Radiological Emergency Response Training," 10 CFR 50.47(b)(15), requires that radiological emergency response training be provided to those who may be called on to assist in an emergency. In addition, 10 CFR Part 50, Appendix E, Section IV.F.1 requires a description of the program that provides for training of employees, exercising by periodic drills, and participation by other assisting persons.

In ESP Plan Section 16, "Radiological Emergency Response Training," the applicant described the radiological emergency response training program which ensures the training, qualification, and requalification of individuals who will be required to provide assistance during an emergency at the PSEG Site. The staff reviewed this section, as well as other relevant portions of the application, to determine whether the application conforms to the applicable guidance and complies with the pertinent regulatory requirements. The staff's primary focus was to evaluate the emergency plan against NUREG-0654, Planning Standard O, which provides the detailed

evaluation criteria that the staff should consider to determine whether the emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(15).

Emergency response training is a shared responsibility between Site Access Training and the Emergency Preparedness Group. Personnel badged for unescorted access to the Protected Area receive a basic emergency plan overview as part of General Employee Training (GET). All individuals entering the Protected Area who are not badged for unescorted access will be continuously escorted. Annual requalification is required to maintain unescorted access to the Protected Area. The Emergency Preparedness Group is responsible for administering the emergency plan training program, including conducting drills and exercises, and the Manager Emergency Preparedness ensures that GET lesson materials are maintained current and accurate.

All personnel assigned to emergency response positions receive annual emergency preparedness training, which is described in position-specific qualification guides. Training methods may include classroom instruction, computer-based instruction, drill training, individual knowledge discussions or evaluation, and are outlined in the position-specific qualification guides. Course content and qualification guides are created using position-specific job-task analysis, which describes the elements necessary to perform the job function. ESP Plan Table 16-1 identifies the training and qualification guide courses required for each ERO position, and ESP Plan Table 16-2 describes the content of each training course. The emergency planning administrative training procedure and Training & Reference Material describe the process for the development and presentation of the training material for emergency preparedness. Records are maintained in accordance with the PSEG training department procedures and guidance.

Periodic training is provided and staff members are assigned at least one training program, drill, conference, or similar training opportunity at least annually. Emergency plan drills are used as tools to practice, train, and demonstrate the skills learned in training and to exercise the interface between PSEG and offsite agencies. If deficiencies are identified during drills, corrective measures will include correction on the spot (or during post-drill critique sessions) by a qualified drill coach or controller. In addition, deficiencies identified in drills or exercises will be tracked in accordance with the PSEG Corrective Action Program. All drills and exercises will be conducted in accordance with ESP Plan Section 15, which is discussed above in Section 13.3.4.3.14 of this report.

PSEG also provides site-specific emergency response training for offsite emergency organizations that may be called on to provide assistance in the event of an emergency. This includes training associated with station response procedures and radiation protection techniques for offsite fire and rescue, ambulance, and hospital staff. Offsite ambulance-squad personnel are trained and qualified in courses equivalent (or superior) to the Red Cross Multimedia course. As discussed in ESP Plan Section 3, the on-shift fire department personnel have received firefighting and first aid training. The first-aid team is a collateral duty of the fire department and is staffed by personnel who are qualified emergency medical technicians (EMTs) in the State of New Jersey. All other training and retraining given to offsite State and municipal emergency response personnel will be provided in accordance with the appropriate State, county, or municipal emergency response plans.

In its Interim Finding Report for Reasonable Assurance, FEMA found that the offsite emergency plans are adequate for this planning standard and the associated evaluation criteria in NUREG-0654.

The staff finds that the applicant has provided for radiological emergency response training to those who may be called on to assist in an emergency. In addition, the applicant described the program that trains employees to ensure they are familiar with their specific emergency response duties, including exercising with periodic drills. The applicant also described the participation in training and drills by other persons whose assistance might be needed, including specialized initial training and periodic retraining.

Conclusion

The staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Planning Standard O. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(15) and 10 CFR Part 50, Appendix E, Section IV.F.1 insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations.

13.3.4.3.16 Responsibility for the Planning Effort: Development, Periodic Review, and Distribution of Emergency Plans

As stated in NUREG-0654, Planning Standard P, “Responsibility for the Planning Effort: Development, Periodic Review and Distribution of Emergency Plans,” 10 CFR 50.47(b)(16) requires that responsibilities for plan development and review and for distribution of emergency plans are established and that planners are properly trained. In addition, 10 CFR Part 50, Appendix E, Section IV.G requires a description of provisions to be employed to ensure that the emergency plan, its implementing procedures, and emergency equipment and supplies are maintained up to date.

In ESP Plan Section 17, “Emergency Plan Administration,” the applicant described the responsibilities associated with maintaining the emergency preparedness program, including the development, review, and distribution of the emergency plan. The staff reviewed this section, as well as other relevant portions of the application, to determine whether the application conforms to the applicable guidance and complies with the pertinent regulatory requirements. The staff’s primary focus was to evaluate the emergency plan compared to NUREG-0654, Planning Standard P, which provides the detailed evaluation criteria that the staff should consider to determine whether the emergency plan meets the applicable regulatory requirements in 10 CFR 50.47(b)(16).

The President and Chief Nuclear Officer – PSEG Nuclear has the overall responsibility to develop and update emergency planning and coordination of the plans with other response organizations. The Manager – Emergency Preparedness has the authority to approve EIPs for adequacy and consistency, and is responsible for ensuring that the EIPs are appropriately interfaced with the plans, procedures, and training of offsite support agencies. In addition, the Manager – Emergency Preparedness approves all revisions to emergency preparedness documents, and is responsible for the review and revision of training procedures and lesson plans in accordance with the licensee’s Nuclear Emergency Preparedness Training Program. The training procedures and lesson plans are based on the approved emergency plan and procedures. ESP Plan Section 16 states that all personnel assigned to emergency response positions are to receive annual emergency preparedness training. ESP Plan Figure 17-1 shows

the organization for coordination and direction of emergency planning matters, and ESP Plan Table 17-1 shows how emergency plan documents are reviewed and approved.

Revisions to the emergency plan and EIPs—including those based on training exercises and drills, and changes onsite or in the environs—are made when necessary in accordance with emergency preparedness administrative procedures (see ESP Plan Attachment 1-1.8). Telephone numbers are updated quarterly. Documents are mailed to copyholders and include instructions for replacing, deleting, and adding pages. Any holder of the emergency plan or EIPs may prepare revisions to any plan section or procedure. The emergency plan and EIPs include a list of the latest revision number and effective date, and all revisions are distributed in accordance with PSEG procedures. The ESP Plan includes a table of contents for the emergency documents, and a cross-reference to the evaluation criteria in NUREG-0654. The typical contents of the ECG and procedures (EIPs) required to implement the emergency plan, some of which are discussed above, are listed in these ESP Plan attachments.

- Attachment 1-1.3 – PSEG Site Station Event Classification Guide
- Attachment 1-1.4 – Emergency Plan Onsite Implementing Procedures
- Attachment 1-1.5 – Emergency Operations Facility
- Attachment 1-1.6 – Emergency News Center
- Attachment 1-1.7 – Security Response
- Attachment 1-1.8 – Administrative Procedures

ITAAC 9.1 states that the licensee has submitted detailed EIPs for the onsite emergency plan no less than 180 days prior to fuel load.

The emergency plan and associated documents are reviewed at least once each year and receive an independent review at least once every 12 months. Agreement letters from offsite agencies and local support groups are verified or updated biennially, or when plan revisions could affect their responsibilities. ESP Plan Table 1-2 provides a detailed listing of supporting plans and their sources. Supporting plans and associated responsibilities are also addressed in ESP Plan Section 2.0 and Attachments 2 and 3. Management directives address evaluation and correction of audit findings, training, readiness testing, and emergency equipment. Review results and actions taken are forwarded to PSEG senior management, and review records are retained for 5 years.

In its Interim Finding Report for Reasonable Assurance, FEMA found that the offsite emergency plans are adequate for this planning standard and the associated evaluation criteria in NUREG-0654.

The staff finds that the applicant has established the responsibilities for plan development and review, including distribution of the emergency plans to all appropriate organizations. In addition, the applicant established provisions to properly train the planners (i.e., the individuals responsible for the emergency planning effort) and described the provisions to be employed to ensure that the emergency plan, its implementing procedures, and emergency equipment and supplies are maintained up-to-date.

Conclusion

The staff concludes that the information provided in the ESPA is consistent with the guidelines in NUREG-0654, Planning Standard P. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(16) and 10 CFR Part 50,

Appendix E, Section IV.G, insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations.

13.3.4.3.17 Evacuation-Time Estimate Analysis

10 CFR 50.47(b)(10) requires, in part, that ETEs have been developed by applicants and licensees, and that licensees shall update the ETEs on a periodic basis. In addition, 10 CFR Part 50, Appendix E, Section IV requires that the applicant provide an analysis of the time required to evacuate various sectors and distances within the plume exposure pathway EPZ for transient and permanent populations, using the most recent U.S. Census Bureau data as of the application submission date. These requirements also apply to ESP applicants that propose complete and integrated emergency plans pursuant to 10 CFR 52.17(b)(2)(ii). NUREG-0654, Appendix 4, "Evacuation Time Estimates within the Plume Exposure Pathway Emergency Planning Zone," contains the detailed guidance to be used by the staff to determine whether the ETE Report meets the applicable regulatory requirements in 10 CFR Part 50, Appendix E. ETEs are part of the required emergency planning basis and provide PSEG and State and local governments with site-specific information needed for protective action decision making.

SSAR Section 13.3.4, "Evacuation Time Estimates," states that an independent ETE study has been performed to provide estimates of the time required to evacuate resident and transient populations surrounding the PSEG Site for various times of the year under favorable and adverse conditions. ESP Plan Attachment 11 consists of the ETE Report "PSEG Site: Development of Evacuation Time Estimates" (KLD TR-445, Revision 1, February 2012). The ETE Report was prepared by KLD Engineering, P.C., in coordination with PSEG personnel and emergency management personnel representing State and local governments. The ETE Report describes the analyses undertaken and the results obtained by a study to develop evacuation time estimates for the PSEG Site. The ETE Report consists of these 13 sections and includes detailed supporting information in Appendices A through N:

- Section 1: Introduction (basic description of the analysis process)
- Section 2: Study Estimates and Assumptions (methodology used)
- Section 3: Demand Estimation (population and vehicles)
- Section 4: Estimation of Highway Capacity (ability of road network to service demand)
- Section 5: Estimation of Trip Generation Time (activity/event time distributions)
- Section 6: Demand Estimation for Evacuation Scenarios (region and scenario evacuation cases)
- Section 7: General Population ETEs (results of computer analyses)
- Section 8: Transit-Dependent and Special Facility ETEs (analyses applied and results obtained)
- Section 9: Traffic Management Strategy (traffic control designed to expedite movement of evacuating traffic)

- Section 10: Evacuation Routes (major evacuation routes for the two counties within the plume exposure pathway EPZ)
- Section 11: Surveillance of Evacuation Operations (concurrent surveillance procedures)
- Section 12: Confirmation Time (suggested approach of stratified random sample and telephone survey to confirm that the evacuation process is effective)
- Section 13: Observations (suggestions to facilitate/improve the evacuation process)

The Executive Summary of the ETE Report includes a summary of the conclusions reached in the report. Specifically, the general population ETEs were computed for 255 unique cases, with the ETEs ranging from 2:00 (hr:min) to 2:55 at the 90th percentile. The ETEs for the 100th percentile are nearly double those for the 90th percentile as a result of the long tail of the evacuation curve caused by those evacuees who take longer to mobilize. Construction/refueling activities add approximately 30 minutes, on average, to the ETE. PSEG is considering a proposed causeway connecting the new PSEG Site with local roads in Elsinboro Township, which will be used by construction workers and new plant personnel. The use of the proposed causeway reduces the ETEs for the 3.2-km (2-mi) Region R01 and 8-km (5-mi) Region R02 by 40 and 10 minutes, respectively. The ETE for the full EPZ (Region R03) is unaffected by the use of the proposed causeway.

Middletown, DE, and Salem, NJ, are the two most congested areas during an evacuation, and all congestion within the EPZ clears by 3 hours after the advisory to evacuate. Special population ETEs were computed for schools, medical facilities, transit-dependent persons, and homebound special needs persons. These ETEs are within a similar range as the general population ETEs, with the exception of the transit-dependent ETEs, which do exceed general population ETEs for some bus routes. The general population ETEs are not significantly impacted by the voluntary evacuation of vehicles from the Shadow Region. Finally, the ETE Report assumes that no Intelligent Transportation Systems (ITS) technologies and traffic management techniques are in place that might benefit the evacuation process and decrease ETEs. (Section 13.3.4.1 of this report addresses additional information in the ETE Report.)

The staff evaluated the ETE Report against the criteria set forth in NUREG-0654, Appendix 4. The evaluation included checking the ETE Report for internal consistency, consistency with other parts of the emergency plan, and consistency with other parts of the ESPA, including the SSAR. The staff verified the citations in the ETE Report by comparing it to the cited document text. General descriptions of the PSEG Site region, population, and highways were verified using internet searches and aerial photographs. The staff reviewed the general road condition, including shoulder and lane width, or the designated evacuation routes, and concluded that there were no impediments to evacuation.

In RAI 2, Questions 13.03-2 through 13.03-8, the staff requested that the applicant address various areas in an earlier version of the ETE Report, "PSEG Site: Development of Evacuation Time Estimates" (KLD TR-445, Revision 0, August 2009), included as ESP Plan Attachment 11, which contained information such as population data for transients and non-EPZ employees, schools and special events within the EPZ, the special needs population, comparison of various evacuation times, and engagement of affected State and local organizations. In a February 2, 2011, response to RAI 2, Questions 13.03-2 through 13.03-8, the applicant addressed the staff's questions and proposed changes that would be added to a future revision of the ETE Report. In Revision 1 of the ESPA (May 21, 2012), PSEG included Revision 1 of the

ETE Report as ESP Plan Attachment 11. The staff reviewed the applicant's responses to RAI 2, Questions 13.03-2 through 13.03-8, and the updated ETE Report. The staff finds the responses acceptable because they adequately respond to the staff's questions in RAI 2, and that the proposed changes to the ETE Report have been reflected in Revision 1. Therefore, the staff considers RAI 2, Questions 13.03-2 through 13.03-8, resolved.

In an August 29, 2012, letter to the NRC, PSEG described the implementation approach for the 11 amendments (enhancements) to the emergency preparedness regulations addressed in the Final Rule. With regard to the requirement in 10 CFR 50.47(b)(10) and 10 CFR Part 50, Appendix E, Section IV for updating ETEs, the applicant stated that PSEG complies with this Final Rule element, as documented in ESP Plan Attachment 11 (i.e., the ETE Report), and that PSEG Nuclear is currently conducting an ETE to comply with this Final Rule element for the Salem and Hope Creek operating units. This ETE is not expected to reach different conclusions from the current ETE contained in the ESP Plan, and PSEG Nuclear will inform PSEG if any differences are identified. In addition, EIPs will address protective action recommendations and will be consistent with the ETE conclusions (see ITAAC 9.1).

The timing associated with the applicant's submission of the ESPA and the effective date of the Final Rule enhancements to emergency preparedness regulations are relevant with regard to the status and acceptability of the ETE included in the ESPA. These dates, which are relevant to the staff's ETE review, reflect (1) ESPA submissions and revisions, (2) U.S. Census Bureau decennial updates, and (3) Final Rule implementation

- 2000—U.S. Census Bureau decennial update
- August 2009—ETE Report, Revision 0
- May 25, 2010—submission of ESPA, Revision 0
- 2010—U.S. Census Bureau decennial update
- November 23, 2011—Final Rule *Federal Register* Notice (76 FR 72560-72600)
- December 23, 2011—effective date of Final Rule, including use by the ETE of the most recent census data from the U.S. Census Bureau (see 10 CFR Part 50, Appendix E, Section IV.4)
- February 2012—ETE Report, Revision 1
- May 21, 2012 —submission of ESPA, Revision 1

In the Final Rule, 10 CFR Part 50, Appendix E, Section IV.2 requires that the ESP applicant's ETE use the most recent U.S. Census Bureau data as of the date the applicant submits its application to the NRC. In ESPA Revision 0, the applicant used the U.S. Census Bureau data files for the year 2000 to develop its ETE, which was the most recent U.S. Census Bureau data available as of the date of the initial submission of the ESPA (i.e., May 25, 2010).

Pursuant to 10 CFR 52.39(b), an applicant for a COL that references this ESP shall update the emergency preparedness information that was provided under 10 CFR 52.17(b), and discuss whether the updated information materially changes the bases for compliance with applicable NRC requirements. As such, the staff identified the following COL action item to assure that

available U.S. Census Bureau data is address by a COL applicant in updating the ETE Report, and that interfaces with the nearby operating plants are considered.

COL Action Item 13.3-8

An applicant for a COL or CP referencing this early site permit should explain how any updated evacuation time estimate (ETE) information for the PSEG Site interfaces with any ETE updates that may have been provided for the nearby Salem and Hope Creek units.

As described above, the staff finds that the applicant has developed adequate ETEs for the plume exposure pathway EPZ for transient and permanent populations using the most recent U.S. Census Bureau data as of the application submission date, and that the ETEs are consistent with the guidance in NUREG-0654, Appendix 4.

Conclusion

The staff concludes that Revision 1 of the ETE Report is consistent with the guidelines in NUREG-0654, Appendix 4. A COL applicant will address COL Action Item 13.3-8. Therefore, the staff finds the information acceptable and meets the relevant requirements of 10 CFR 50.47(b)(10); 10 CFR Part 50, Appendix E, Section IV; and 10 CFR 52.17(b)(2)(ii), insofar as the information describes the essential elements of advanced planning and the provisions made to cope with emergency situations,

13.3.5 Conclusion

The staff reviewed the complete and integrated emergency plans provided in the PSEG ESP application for the proposed new unit(s) at the PSEG Site. The staff reviewed the onsite emergency plan against the relevant requirements of 10 CFR 50.33, "Contents of Applications: General Information"; 10 CFR 50.47; 10 CFR 50.72; 10 CFR Part 50, Appendix E; 10 CFR 52.17; 10 CFR 52.18; and 10 CFR 100.21, "Non-seismic Site Criteria," using the guidance criteria in NUREG-0654; NUREG-0737, Supplement 1; NUREG-0800; and NSIR/DPR-ISG-01. The staff concludes that, provided that the permit conditions identified below are adequately addressed and the enumerated ITAAC are performed and met, the PSEG onsite emergency plan establishes an adequate planning basis for an acceptable state of onsite emergency preparedness, and there is reasonable assurance that the plan can be implemented.

FEMA provided its findings and determinations concerning the adequacy of offsite emergency planning and preparedness, which are based on its review of State and local emergency plans. FEMA concluded that the offsite State and local emergency plans are adequate to cope with an incident at the proposed PSEG Site and that there is reasonable assurance that these plans can be implemented. On the basis of its review of these FEMA findings and determinations, the staff concludes that, provided that the permit conditions identified below are adequately addressed and the enumerated ITAAC are performed and met, the PSEG Site offsite emergency plans establish an adequate planning basis for an acceptable state of offsite emergency preparedness, and there is reasonable assurance that the plans can be implemented.

Pursuant to 10 CFR 52.17(b)(3), the PSEG Site emergency plan includes the proposed inspections, tests, and analyses that the holder of a COL referencing the PSEG Site ESP shall

perform, and the acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, then the new unit(s) at the PSEG Site has been constructed and will operate in conformity with the license, the provisions of the Atomic Energy Act of 1954, and NRC regulations.

Consistent with the resolution of Confirmatory Item 13.3-1, addressed in Section 13.3.4.3.14 of this report, the staff concludes that the emergency plans provide an adequate expression of the overall concept of operation and describe the essential elements of advanced planning and the provisions made to cope with emergency situations. Thus, the staff concludes that the overall state of onsite and offsite emergency preparedness, when fully implemented, will meet the requirements of 10 CFR 50.33(g); 10 CFR 50.47; 10 CFR 50.72(a)(3); 10 CFR Part 50, Appendix E; 10 CFR 52.17(b)(1); 10 CFR 52.17(b)(2)(ii); 10 CFR 52.17(b)(3); 10 CFR 52.17(b)(4); 10 CFR 52.18; and 10 CFR 100.21(g). Further, pursuant to 10 CFR 50.47(a), the staff concludes that, subject to the required conditions and limitations of the full-power license and satisfactory completion of the ITAAC, there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at the new unit(s), and that emergency preparedness at the PSEG Site is adequate to support full power operations.

When referenced by a COL applicant pursuant to 10 CFR 52.73, "Relationship to Subparts A and B," this ESP is subject to these COL action items and permit conditions (and to the ITAAC contained in Table 13.3-1 of this report):

COL Action Items 13.3-1 through 13.3-8

- 13.3-1 An applicant for a COL or CP referencing this early site permit should submit to the NRC updated letters of agreement or memoranda of understanding with offsite support organizations to reflect the chosen plant design. (See Section 13.3.4.2 of this report.)
- 13.3-2 An applicant for a COL or CP referencing this early site permit should revise the emergency plan to describe the components, availability, and power supplies for the Federal Telecommunications System (FTS), including all required communications and data links associated with the chosen reactor technology. (See Section 13.3.4.3.6 of this report.)
- 13.3-3 An applicant for a COL or CP referencing this early site permit and the US-APWR standard design should revise the emergency plan to describe the location and capabilities of the Operations Support Center (OSC). (See Section 13.3.4.3.8 of this report.)
- 13.3-4 An applicant for a COL or CP referencing this early site permit should revise the emergency plan to describe the radiation monitoring and other systems and equipment, including potential major release points from the plant and river water level monitoring requirements, associated with the chosen reactor technology that support accident assessment activities. The emergency plan should also identify the specific monitoring capability for the radiological parameters identified in NRC Regulatory Guide 1.97, Revision 2, and dose assessment and projection modeling system. (See Section 13.3.4.3.9 of this report.)
- 13.3-5 An applicant for a COL or CP referencing this early site permit should revise the emergency plan to describe the availability of a proposed causeway for use as an

alternate route for evacuating the site. If appropriate, the applicant should update the evacuation time estimate (ETE) analysis for the PSEG Site to reflect the causeway, and provide confirmation that the ETE update was provided to State and local governmental authorities for use in developing offsite protective action strategies. (See Section 13.3.4.3.10 of this report.)

- 13.3-6 An applicant for a COL or CP referencing this early site permit and the US-APWR design control document (DCD) should revise the emergency plan to identify the location of the onsite personnel decontamination facility. (See Section 13.3.4.3.11 of this report.)
- 13.3-7 An applicant for a COL or CP referencing this early site permit should revise the emergency plan to describe the method for determining atmospheric transport and diffusion throughout the 10-mile plume exposure emergency planning zone during emergency conditions, including the ability to periodically estimate total population exposure. (See Section 13.3.4.3.13 of this report.)
- 13.3-8 An applicant for a COL or CP referencing this early site permit should explain how any updated evacuation time estimate (ETE) information for the PSEG Site interfaces with any ETE updates that may have been provided for the nearby Salem and Hope Creek units. (See Section 13.3.4.3.17 of this report.)

Permit Conditions 5 through 9

- 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. (See Section 13.3.4.3.2 of this report.)
- 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. (See Section 13.3.4.3.2 of this report.)

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. (See Section 13.3.4.3.2 of this report.)
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). (See Section 13.3.4.3.4 of this report.)
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). (See Section 13.3.4.3.4 of this report.)

Table 13.3-1 PSEG Site ITAAC

Planning Standard	EP Program Elements	Inspections, Tests, Analyses	Acceptance Criteria
1.0 Emergency Classification System			
<p>10 CFR 50.47(b)(4) A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee, and state and local response plans for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures.</p>	<p>1.1 A standard emergency classification and emergency action level (EAL) scheme exists, and identifies facility system and effluent parameters constituting the bases for the classification scheme. [D.1**] [**D.1 corresponds to NUREG-0654/ FEMA-REP-1 evaluation criteria.]</p>	<p>1.1 An inspection of the Control Room, Technical Support Center (TSC), and Emergency Operations Facility (EOF) will be performed to verify that they have displays for retrieving facility system and effluent parameters as specified in the Emergency Classification and EAL scheme, and the displays are functional.</p>	<p>1.1(a) The parameters referenced in the Emergency Classification and EAL scheme are retrievable in the Control Room, TSC and EOF. 1.1(b) The ranges of the displays encompass the values specified in the Emergency Classification and EAL scheme.</p>
2.0 Notification Methods and Procedures			
<p>10 CFR 50.47(b)(5) – Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and follow-up messages to response organizations and the public has been established; and means to provide early notification and clear instruction to the populace within the plume exposure pathway Emergency Planning Zone have been established.</p>	<p>2.1 The means exist to notify responsible State and local organizations within 15 minutes after the licensee declares an emergency. [E.1]</p>	<p>2.1 A test will be performed to demonstrate the capabilities for providing initial notification to the offsite authorities after a simulated emergency classification.</p>	<p>2.1 The States of Delaware and New Jersey, and Kent, New Castle, Cumberland, and Salem Counties received notification within 15 minutes after the declaration of an emergency from the Control Room, TSC, or EOF.</p>
	<p>2.2 The means exist to notify emergency response personnel. [E.2]</p>	<p>2.2 A test of the primary and backup emergency response organization (ERO)</p>	<p>2.2 A test of the primary and backup ERO notification system resulted in:</p>

		notification systems will be performed	<p>a. ERO personnel received the notification message;</p> <p>b. Mobilization communication validated by personnel response to the notification system or by telephone;</p> <p>c. Response to electronic notification and plant public address system demonstrated during normal working hours, and off hours</p>
	2.3 The means exist to notify and provide instructions to the populace within the plume exposure emergency planning zone (EPZ). [E.6]	2.3 A full test of the Prompt Alerting and Notification System and the Emergency Alert System capabilities will be conducted.	2.3 Notification and clear instructions to the public accomplished in accordance with the emergency plan requirements.

3.0 Emergency Communications

10 CFR 50.47(b)(6) – Provisions exist for prompt communications among principal response organizations to emergency personnel and to the public.	3.1 The means exist for communications among the Control Room, TSC, EOF, principal State and local emergency operations centers (EOCs), and field monitoring teams. [F.1.d]	<p>3.1(a) A test will be performed to demonstrate (both primary and secondary methods/systems) the ability to communicate from the Control Room, TSC and the EOF to responsible State and local government agencies.</p> <p>3.1(b) A test will be performed to demonstrate (both primary and secondary methods/systems) the ability to communicate from the TSC and the EOF to PSEG field monitoring teams</p>	<p>3.1(a) Demonstrated (both primary and secondary methods/systems) the ability to communicate from the Control Room, TSC and the EOF to responsible State and local government agencies.</p> <p>3.1(b) Demonstrated (both primary and secondary methods/systems) the ability to communicate from the TSC and the EOF to PSEG field monitoring teams.</p>
	3.2 The means exist for communications from the Control Room, TSC, and EOF to the NRC headquarters and regional office EOCs (including	3.2 A test will be performed to demonstrate the ability to communicate from the Control Room, TSC and the EOF to the NRC Operations Center utilizing the	3.2 Communications are established between the Control Room, TSC and EOF to the NRC headquarters and regional office EOCs utilizing the ENS. The TSC and EOF demonstrated

	establishment of the Emergency Response Data System (ERDS) [or its successor system] between the onsite computer system and the NRC Operations Center.) [F.1.f]	Emergency Notification System (ENS). The Health Physics Network (HPN) is tested to ensure communications between the TSC and EOF with the NRC Operations Centers. ERDS is established [or its successor system] between the onsite computer systems and the NRC Operations Center.	communications with the NRC Operations Center using the HPN. The access port for ERDS [or its successor system] is provided and successfully completes a transfer of data from the Unit to the NRC Operations Center.
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4.0 Public Education and Information

10 CFR 50.47(b)(7) – Information is made available to the public on a periodic basis on how they will be notified and what their initial actions should be in an emergency (e.g., listening to a local broadcast station and remaining indoors), the principal points of contact with the news media for dissemination of information during an emergency (including the physical location or locations) are established in advance, and procedures for coordinated dissemination of information to the public are established.	4.1 The licensee has provided space which may be used for a limited number of the news media. [G.3.b]	4.1 An inspection of the as-built facility/area provided for the news media will be performed in the Emergency News Center/Joint Information Center (ENC/JIC).	4.1 The ENC/JIC included equipment to support the ENC/JIC operations, including communications with: <ul style="list-style-type: none"> a. TSC and EOF b. Principal State and local EOCs c. The news media Designated space is available for news media briefings.
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5.0 Emergency Facilities and Equipment

10 CFR 50.47(b)(8) – Adequate emergency facilities and equipment to support the emergency	5.1 The licensee has established a TSC and an onsite Operations Support Center (OSC). [H.1, H.9]	5.1 An inspection of the as-built TSC and OSC will be performed, including a test of their capabilities.	5.1.1 The TSC has at least 1875 ft ² of floor space (75 ft ² per person for a minimum of 25 persons).
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response are provided and maintained.			
			5.1.2 Communication equipment is installed in the TSC and OSC, and voice transmission and reception are accomplished.
			5.1.3 The TSC ventilation system includes a high-efficiency particulate air (HEPA), and charcoal filter and radiation monitors are installed.
			5.1.4 The TSC has the means to receive, store, process, and display plant and environmental information, and enable the initiation of emergency measures and the conduct of emergency assessment. These capabilities are demonstrated during testing and acceptance activities.
			5.1.5 A reliable and backup electrical power supply is available for the TSC.
			5.1.6 There is an OSC located inside the Protected Area.
	5.2 The licensee has established an EOF. [H.2]	5.2 An inspection of the EOF will be performed, including a test of the capabilities.	5.2.1 Demonstrated communications between the Control Room, TSC, EOF, field monitoring teams, NRC, responsible State and county agencies, and the ENC/JIC.
			5.2.2 The parameters referenced in the Emergency Classification and EAL scheme are retrievable in the EOF.

			5.2.3 Demonstrated the capability of the EOF to respond to events at two or more reactors on the site in accordance with emergency plan implementing procedures (EIPs), including the capabilities to discriminate plant data, staffing and operation of the facility.
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6.0 Accident Assessment

10 CFR 50.47(b)(9) – Adequate methods, systems and equipment for assessing and monitoring actual or potential off-site consequences of a radiological emergency condition are in use.	6.1 The means exist to provide initial and continuing radiological assessment throughout the course of an accident. [1.2].	6.1 A test of the Emergency Plan will be conducted by performing a drill or exercise to verify the capability to perform accident assessment.	6.1 Using selected monitoring parameters specified in the PSEG Site Emergency Plan, including EALs (ITAAC Acceptance Criteria 1.1), simulated degraded plant conditions are assessed and protective actions are initiated in accordance with the following criteria: a. Demonstrated the ability to obtain onsite radiological surveys and samples. b. Demonstrated the ability to continuously monitor and control radiation exposure to emergency workers. c. Demonstrated the ability to assemble and deploy field monitoring teams within 60 minutes from the decision to do so. d. Demonstrated the ability to satisfactorily collect and disseminate field team data. e. Demonstrated the ability to develop dose projections.
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			<p>f. Demonstrated the ability to make the decision whether to issue radioprotective drugs (KI) to onsite emergency workers.</p> <p>g. Demonstrated the ability to develop appropriate protective action recommendations (PARs) and notify appropriate authorities within 15 minutes of development.</p>
	<p>6.2 The means exist to determine the source term of releases of radioactive material within plant systems, and the magnitude of the release of radioactive materials based on plant system parameters and effluent monitors. [I.3]</p>	<p>6.2 A test will be performed to demonstrate that the means exist to determine the source term of releases of radioactive material within plant systems, and the magnitude of the release of radioactive materials based on plant system parameters and effluent monitors.</p>	<p>6.2 Demonstrated through training or drills that Emergency Plan Implementing Procedures (EPIPs) provide direction to accurately calculate the source terms and the magnitude of the release of postulated accident scenario releases.</p>
	<p>6.3 The means exist to continuously assess the impact of the release of radioactive materials to the environment, accounting for the relationship between effluent monitor readings, and onsite and offsite exposures and contamination for various meteorological conditions. [I.4]</p>	<p>6.3 A test will be performed that provides evidence that the impact of a radiological release to the environment can be assessed by using the relationship between effluent monitor readings, and onsite and offsite exposures and contamination for various meteorological conditions.</p>	<p>6.3 Demonstrated through training or drills that EPIPs provide direction to continuously assess the impact of the release of radioactive materials to the environment, accounting for the relationship between effluent monitor readings, and onsite and offsite exposures and contamination for various meteorological conditions.</p>
	<p>6.4 The means exist to acquire and evaluate meteorological information. [I.5]</p>	<p>6.4 A test will be performed to acquire and evaluate meteorological data/information.</p>	<p>6.4 Demonstrated that meteorological data necessary to implement the EPIPs is retrievable in the Control Room, TSC and EOF.</p>
	<p>6.5 The means exist to determine the</p>	<p>6.5 A test will be performed of the</p>	<p>6.5 Demonstrated through training or drills that EPIPs</p>

	release rate and projected doses if the instrumentation used for assessment is off-scale or inoperable. [I.6]	capabilities to determine the release rate and projected doses if the instrumentation used for assessment is off-scale or inoperable.	provide direction to determine release rate and projected dose rates when instruments are off-scale or inoperable.
	6.6 The means exist for field monitoring within the plume exposure EPZ. [I.7]	6.6 A test will be performed of the capabilities for field monitoring within the plume exposure EPZ.	6.6 Demonstrated through training or drills that the field monitoring teams were dispatched and able to locate and monitor a radiological release within the plume exposure EPZ during a radioactive release scenario.
	6.7 The means exist to make rapid assessment of actual or potential magnitude and locations of radiological hazards through liquid or gaseous release pathways, including activation, notification means, field team composition, transportation, communication, monitoring equipment, and estimated deployment times. [I.8]	6.7 A test will be performed of the capabilities to make rapid assessments of actual or potential magnitude and locations of radiological hazards through liquid or gaseous release pathways, including activation, notification means, field team composition, transportation, communication, monitoring equipment, and estimated deployment times.	6.7 Demonstrated through training or drills using EPIPs: a. A qualified field monitoring team was promptly notified, activated, briefed and dispatched from the EOF during a radiological release scenario. b. The team used monitoring equipment, transportation, communication from the field and located specific sampling locations. c. The team made rapid assessment of actual or potential magnitude and locations of any radiological hazards from simulated liquid or gaseous releases.
	6.8 The capability exists to detect and measure radioiodine concentrations in air in the plume exposure EPZ, as low as 10^{-7} $\mu\text{Ci/cc}$ (microcuries per cubic centimeter) under field conditions. [I.9]	6.8 A test will be performed of the capabilities to detect and measure radioiodine concentrations in air in the plume exposure EPZ, as low as 10^{-7} $\mu\text{Ci/cc}$ under field conditions.	6.8 A field monitoring team demonstrated, in accordance with the appropriate EPIP(s), the use of sampling and detection equipment for air concentrations in the plume exposure EPZ during a radioactive

			release scenario as low as 10 ⁻⁷ µCi/cc.
	6.9 The means exist to estimate integrated dose from the projected and actual dose rates, and for comparing these estimates with the Environmental Protection Agency (EPA) protective action guides (PAGs). [I.10]	6.9 A test will be performed of the capabilities to estimate integrated dose from the projected and actual dose rates, and for comparing these estimates with the EPA PAGs.	6.9 Personnel demonstrated the ability to estimate integrated dose from the dose assessment program and the field monitoring team reading during a radioactive release scenario. The results were successfully compared with the EPA PAGs.
7.0 Protective Response			
10 CFR 50.47(b)(10) – A range of protective actions has been developed for the plume exposure EPZ for emergency workers and the public. In developing this range of actions, consideration has been given to evacuation, sheltering, and, as a supplement to these, the prophylactic use of potassium iodide (KI), as appropriate. Guidelines for the choice of protective actions during an emergency, consistent with Federal guidance, are developed and in place, and protective actions for the ingestion exposure EPZ appropriate to the locale have been developed.	7.1 The means exist to warn and advise onsite individuals of an emergency, including those in areas controlled by the operator, including: [J.1] 1. Employees not having emergency assignments. 2. Visitors. 3. Contractor and construction personnel. 4. Other people who may be in the public access areas, on or passing through the site, or within the owner controlled area.	7.1 A test will be performed of the capabilities to warn and advise onsite individuals of an emergency, including those in the Owner Controlled Area and the immediate vicinity.	7.1 Demonstrated the ability to warn and advise onsite individuals including: 1. Non-essential employees. 2. Visitors. 3. Contractor and construction personnel. 4. Other personnel within the Owner Controlled Area and the immediate vicinity.
8.0 Exercises and Drills			
10 CFR 50.47(b)(14) – Periodic exercises are (will be) conducted to evaluate major portions of emergency	8.1 Licensee conducts a full participation exercise to evaluate major portions of	8.1 A full participation exercise (test) will be conducted within the specified time periods	8.1.1 The exercise is completed within the specified time periods of 10 CFR Part 50, Appendix E; onsite

<p>response capabilities, periodic drills are (will be) conducted to develop and maintain key skills, and deficiencies identified as a result of exercises or drills are (will be) corrected.</p>	<p>emergency response capabilities, which includes participation by the State and local agency within the plume exposure EPZ, and each State within the ingestion control EPZ. [N.1]</p>	<p>of 10 CFR Part 50, Appendix E.</p>	<p>exercise objectives have been met, and there are no uncorrected onsite exercise deficiencies.</p>
			<p><i>A. Accident Assessment and Classification</i></p> <p>1. Demonstrated the ability to identify initiating conditions, determine EAL parameters, and correctly classify the emergency throughout the exercise.</p> <p>Standard Criteria:</p> <p>a. Determined the correct highest emergency classification level based on events which were in progress, considering past events and their impact on the current conditions, within 15 minutes from the time the initiating condition(s) or EAL is identified.</p>
			<p><i>B. Notifications</i></p> <p>1. Demonstrated the ability to alert, notify and mobilize site emergency response personnel.</p> <p>Standard Criteria:</p> <p>a. Completed the designated checklist and performed the plant page announcement of the emergency classification.</p>

			<p>b. Activated the Emergency Outdial System following the initial event classification for an Alert or higher.</p> <p>2. Demonstrated the ability to notify responsible State agencies within 15 minutes and the NRC within 60 minutes after declaring an emergency.</p> <p>Standard Criteria:</p> <p>a. Transmitted information using the designated checklist, in accordance with approved Emergency Plan documents within 15 minutes of event classification</p> <p>b. Transmitted follow-up notification information using the designated checklist, in accordance with approved Emergency Plan documents.</p> <p>c. Transmitted information using designated checklist within 60 minutes of event classification to the NRC.</p> <p>3. Demonstrated the ability to warn or advise onsite individuals of emergency conditions.</p> <p>Standard Criteria:</p> <p>a. Initiated notification of onsite individuals (via public address, Owner Controlled Area sirens or telephone) using designated checklist.</p>
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			<p>4. Demonstrated the capability of the Prompt Alerting System to operate properly for public notification when required.</p> <p>Standard Criteria:</p> <p>a. \geq90 percent of the sirens operate properly as indicated by the siren feedback system.</p>
			<p>C. <i>Emergency Response</i></p> <p>1. Demonstrated the capability to direct and control emergency operations.</p> <p>Standard Criteria:</p> <p>a. Overall emergency command and control demonstrated in the Control Room (simulator) in the early phase of the emergency and by the TSC within 90 minutes from initial event classification of Alert or higher.</p> <p>2. Demonstrated the ability to transfer Emergency Coordinator function from the Shift Manager in the Control Room (simulator) to the Emergency Duty Officer in the TSC and later to the Emergency Response Manager in the EOF.</p> <p>Standard Criteria:</p> <p>a. Briefings were conducted prior to turnover responsibility. Personnel</p>

			<p>documented transfer of duties.</p> <p>3. Demonstrated the ability to prepare for 24-hour staffing requirements.</p> <p>Standard Criteria:</p> <p>a. Completed 24-hour staff assignments.</p> <p>4. Demonstrated the ability to perform assembly and accountability for all personnel in the Protected Area within 30 minutes of an emergency (after accountability message has been announced) requiring Protected Area accountability.</p> <p>Standard Criteria:</p> <p>a. Protected Area personnel accountability completed within 30 minutes of an emergency (after accountability message has been announced) requiring Protected Area accountability.</p>
			<p><i>D. Emergency Response Facilities</i></p> <p>1. Demonstrated activation of the Operations Support Center (OSC) and full functional operation of the TSC and EOF within 90 minutes of event classification.</p> <p>Standard Criteria:</p> <p>a. The TSC and OSC activated within 90 minutes of the initial</p>

			<p>classification of an Alert or higher.</p> <p>b. The EOF activated within 90 minutes of the initial classification of Site Area Emergency or higher.</p> <p>2. Demonstrated the adequacy of the equipment, security provisions, and habitability precautions for the TSC, OSC, EOF and ENC/JIC, as appropriate.</p> <p>Standard Criteria:</p> <p>a. Demonstrated the adequacy of the emergency equipment in the emergency response facilities including availability and general consistency with the EPIPs.</p> <p>b. Personnel assigned to the ERO implemented and followed applicable EPIPs.</p> <p>c. The Shift Radiation Protection Technician (on-shift), Radiological Assessment Coordinator (TSC), and Radiological Support Manager (EOF) implemented the designated checklist if an onsite/offsite release occurred.</p> <p>3. Demonstrated the adequacy of communications for all emergency support resources.</p> <p>Standard Criteria:</p>
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			<ul style="list-style-type: none"> a. Emergency response communications listed in the EIPs are available and operational. b. Communications systems are tested in accordance with the TSC, OSC and EOF activation checklists. c. Emergency response facility personnel are able to operate all specified communications systems. d. Clear primary and backup communications links are established and maintained for the duration of the exercise.
			<p><i>E. Radiological Assessment and Control</i></p> <ul style="list-style-type: none"> 1. Demonstrated the ability to obtain onsite radiological surveys and samples. <p>Standard Criteria:</p> <ul style="list-style-type: none"> a. Radiation Protection Technicians demonstrated the ability to obtain appropriate instruments (range and type) and perform surveys. b. Airborne samples taken when the conditions indicate the need for the information. <ul style="list-style-type: none"> 2. Demonstrated the ability to continuously monitor and control

			<p>radiation exposure to emergency workers.</p> <p>Standard Criteria:</p> <ul style="list-style-type: none"> a. Emergency workers issued self-reading dosimeters when radiation levels require, and exposures controlled to 10 CFR Part 20 limits (unless the Shift Manager or Emergency Duty Officer, or designee, authorizes emergency limits). b. Exposure records are available from the site database (primary), a personal computer database (backup), or a hard copy report (backup). <p>3. Demonstrated the ability to assemble and dispatch field monitoring teams.</p> <p>Standard Criteria:</p> <ul style="list-style-type: none"> a. An onsite Field Monitoring Team is ready to be deployed within 60 minutes of being requested from the declaration of an Alert or higher. <p>4. Demonstrated the ability to satisfactorily collect and disseminate field team data.</p> <p>Standard Criteria:</p> <ul style="list-style-type: none"> a. Field team data to be collected is dose rate or counts per minute (cpm) from the plume,
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			<p>both open and closed window, and air sample (gross/net cpm) for particulate and iodine, if applicable.</p> <p>b. Radiological data disseminated from the Field Team to the Offsite Field Team Coordinator/ Communicator.</p> <p>5. Demonstrated the ability to develop dose projections.</p> <p>Standard Criteria:</p> <p>a. The Shift Radiation Protection Technician performed timely and accurate dose projections, in accordance with the EIPs.</p> <p>6. Demonstrated the ability to develop appropriate protective action recommendations (PARs), and notified New Jersey and Delaware within 15 minutes of a General Emergency declaration or of an update of the previously issued PARs.</p> <p>Standard Criteria:</p> <p>a. Total Effective Dose Equivalent (TEDE) and Committed Dose Equivalent (CDE) dose projections from the dose assessment computer code, established in accordance with the EIPs.</p>
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			<ul style="list-style-type: none"> b. PARs developed within 15 minutes of data availability. c. PARs transmitted via voice, fax, or electronically within 15 minutes, as required by the EPIPs.
			<p><i>F. Public Information</i></p> <ul style="list-style-type: none"> 1. Demonstrated the capability to develop and disseminate clear, accurate, and timely information to the news media. <p>Standard Criteria:</p> <ul style="list-style-type: none"> a. Media briefings provided within approximately 60 minutes of activation of the ENC/JIC. 2. Demonstrated the capability to establish and effectively operate rumor control in a coordinated fashion. <p>Standard Criteria:</p> <ul style="list-style-type: none"> a. Calls answered in a timely manner with the correct information. b. Calls returned or forwarded, as appropriate, to demonstrate responsiveness. c. Rumors identified and addressed.
			<p><i>G. Evaluation</i></p> <ul style="list-style-type: none"> 1. Demonstrated the ability to conduct a

			<p>post-exercise critique, to determine areas requiring improvement and corrective action.</p> <p>Standard Criteria:</p> <ul style="list-style-type: none"> a. Drill and Exercise objectives developed to allow for performance evaluation. b. Significant problems in achieving the objectives discussed to ensure understanding of why objectives were not fully achieved.
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			<p>8.1.2 Onsite emergency response personnel were mobilized in sufficient numbers to fill emergency response positions identified in Emergency Plan Section 3, Emergency Organization, and they successfully performed assigned responsibilities.</p>
			<p>8.1.3 The exercise was completed within the specified time periods of Appendix E to 10 CFR Part 50, offsite exercise objectives were met, and there were no uncorrected offsite exercise deficiencies; or a license condition requires offsite deficiencies to be corrected prior to operation above 5 percent of rated thermal power.</p>

9.0 Implementing Procedures			
<p>10 CFR Part 50, Appendix E.V - No less than 180 days before the scheduled issuance of an operating license for a nuclear power reactor or a license to possess nuclear material, the applicant's detailed implementation procedures for its emergency plan shall be submitted to the Commission.</p>	<p>9.1 The licensee has submitted detailed implementation procedures for its emergency plan no less than 180 days before fuel load.</p>	<p>9.1 An inspection of the submittal letter will be performed.</p>	<p>9.1 The licensee has submitted detailed EIPs for the onsite emergency plan no less than 180 days before fuel load.</p>

13.6 Physical Security

13.6.1 Introduction

The early site permit (ESP) application for the PSEG Site, submitted by PSEG Power, LLC, and PSEG Nuclear, LLC (the applicant), describes the site characteristics applicable to security and provides information to demonstrate that security plans and measures can be developed in accordance with the applicable requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 73.55, "Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors against Radiological Sabotage," and 10 CFR 100.21(f). Within Chapter 1, "Introduction and General Description," Chapter 2, "Site Characteristics and Site Parameters," and Chapter 13, "Conduct of Operations," Section 13.6, "Industrial Security," of the Site Safety Analysis Report (SSAR), contained in Part 2 of the PSEG ESP application, the applicant described the characteristics of the proposed site and the bounding parameters that establish the Plant Parameter Envelope (PPE) within which a reactor design will be selected before applying for a combined license (COL) for construction and operation of one or two units.

The applicant's proposed site (referred to as PSEG Site) is located in the Lower Alloways Creek Township, Salem County, NJ, on the southern part of Artificial Island on the eastern bank of the Delaware River, it is adjacent to and bordered on the west and south by the low coastal plain - tidal affected area of the Delaware River. The proposed site comprises a 734-acre PSEG property surrounded by extensive marshlands, and meadowlands. The layout of the PSEG Site is provided in SSAR Figure 1.2-3, "Site Utilization Plan," and in the aerial photograph in Figure 2.1-3, "View of PSEG Site," of the Environmental Report (ER) contained in Part 3 of the ESP application.

13.6.2 Summary of Application

SSAR Chapter 1, "Introduction and General Description," and SSAR Chapter 2, "Site Characteristics and Site Parameters," provide information on the specific site location, site description, various site maps and, PSEG Site aerial photographs that depict site topography. The application includes descriptions and depictions of the locations of existing industrial facilities, power generating stations, sewage treatment plants, pipelines, waterways, mining

operations, highways, railroads, airports, airways, and military facilities. The application also provides descriptions and evaluations of potential hazards within the vicinity of the site (explosions, flammable vapor clouds, toxic chemicals, fires, liquid spills, radiological hazards, dam failures, etc.) including natural hazards, such as floods, ice, and seismic activity. SSAR Section 13.6, "Industrial Security," describes site characteristics to address the applicable regulatory requirements for the PSEG Site to be such that adequate security plans and measures can be developed.

SSAR Chapters 1 and 2 and the ER include diagrams that provide (or identify) site layout depictions including a center-point reference to the proposed Power Block location inside a 70-acre land mass, and located at U.S. National Grid (NAD83); longitude: 75° 32' 24.3316"; latitude: 39° 28' 23.7436". The diagrams also depict other features of interest such as an overall layout of the location of the site, which is north of Hope Creek Generating Station (HCGS) and Salem Generating Station (SGS), and a proposed Exclusion Area Boundary (EAB) that will encompass the new plant. SSAR Chapters 1 and 2 and the ER also describe other manmade features such as a proposed barge slip, intake structures, and an existing Hope Creek fuel oil storage tank. The PSEG Site Utilization Plan map in SSAR Figure 1.2-3, coupled with the aerial photograph of ER Figure 2.1-3, provides information that can be used to assess additional manmade and natural features.

13.6.3 Regulatory Basis

The provisions of 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Subpart A, "Early Site Permits," establishes the requirements and procedures applicable to the U.S. Nuclear Regulatory Commission (NRC) issuance of an ESP for approval of a site for one or more nuclear power facilities separate from the filing of an application for a construction permit or a COL for the facility.

Provisions in 10 CFR 52.17, "Contents of Applications; Technical Information" set forth the requirements for the contents and technical information to be submitted in applications under this subpart:

- 10 CFR 52.17(a)(1)(x), as it relates to the requirement for submission of information to demonstrate that the site characteristics are such that adequate security plans and measures can be developed.
- 10 CFR 52.17(a)(1)(xii), as it relates to the requirement for submission of an evaluation of the site against applicable sections of the Standard Review Plan (SRP) revision in effect 6 months before the docket date of the application.

The provisions in 10 CFR 73.55, "Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage," set forth the requirements for power reactor licensees and applicants to establish and maintain a physical protection program, including a security organization, which will have as its objective to provide high assurance that activities involving special nuclear material are not harmful to the common defense and security and do not constitute an unreasonable risk to public health and safety.

The provisions in 10 CFR 100.21, "Non-seismic siting criteria," set forth the requirements regarding non-seismic siting criteria for proposed commercial power reactor sites.

- 10 CFR 100.21(f), as it relates to the requirement that site characteristics to be such that adequate security plans and measures can be developed.

Acceptance criteria adequate to meet the above requirements include those set forth in:

1. Regulatory Guide (RG) 4.7, "General Site Suitability Criteria for Nuclear Power Stations," Revision 2, April 1998, as it relates to the suitability criteria for a proposed site.
2. NUREG 0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Chapter 13, "Conduct of Operations," Section 13.6.3, "Physical Security – Early Site Permit," Revision 1; October 2010⁶, as it relates to the review of physical security aspects of a permit application for a proposed site.

13.6.4 Technical Evaluation

In conducting the technical evaluation of the information contained in SSAR Chapter 13, "Conduct of Operations," Section 13.6 "Industrial Security", the staff also reviewed the pertinent information and figures contained in the following SSAR chapters and sections:

- Chapter 1, "Introduction and General Discussion"; Section 1.1, "Introduction"; Section 1.2, "General Plant Description"
- Chapter 2, "Site Characteristics and Site Parameters"; Section 2.0, "Site Characteristics"; Section 2.1, "Geography and Demography"; Section 2.2, "Identification of Potential Hazards in Site Vicinity"; and Section 2.4, "Hydrologic Engineering"
- Chapter 3, "Design of Structures, Components, Equipment and Systems"; Section 3.5.1.6, "Aircraft Hazards"; Section 3.5.1.6.1, "Airports"; Section 3.5.1.6.2, "Military Airports and Routes"; Section 3.5.1.6.3, "Airways"; and Section 3.5.1.6.4, "References"

In addition, the staff reviewed the pertinent information and figures contained in the ER, Chapters 1 and 2, to confirm information regarding the site characteristics, and to ensure information in the SSAR and ER, applicable to the review of physical security, is consistent.

The staff review focused on (1) whether the information in the application meets the requirements stated in 10 CFR 52.17(a)(1)(x) to demonstrate that the site is such that security plans and measures can be developed, (2) that the applicant has considered the applicable physical protection requirements stated in 10 CFR 73.55 in the selection of the site and its proposed layout, (3) that the information in the application related to the site characteristics and potential hazards provided sufficient technical basis to demonstrate that the site characteristics and potential hazards do not present impediments to preclude the development of adequate security plans and measures consistent with 10 CFR 100.21(f).

The staff review also included information the applicant submitted in response to Requests for Additional Information (RAI) 3, Questions 13.06.03-1, 13.06.03-2, 13.06.03-4, 13.06.03-5, and RAI 17, Question 13.06.03-6. These are discussed in the following sections of this report.

⁶ The staff utilized Revision 1 (October 2010) of NUREG-0800 (SRP), Section 13.6.3, for the ESP application physical security review. The changes between the 2007 and 2010 versions were addressed by means of RAIs; therefore, Revision 1 is the referenced SRP Section 13.6.3 revision for this ESP review.

13.6.4.1 Security Boundaries

In SSAR Section 13.6, the applicant stated: “The PSEG site is sufficiently large to provide adequate distances between structures and the probable location of security boundaries.” The applicant also stated the following: “When a reactor technology selection is made and a combined license application is prepared, the specific design features to assure site security in compliance with 10 CFR 73.55, will be defined.”

SSAR Figure 1.2-3 depicts the new PSEG property lines, EAB, plant parameters for the proposed new plant Power Block and related facilities, and water structures as well as the existing PSEG property lines, plant facilities and boundaries of Salem and Hope Creek Generating Stations. In addition, SSAR Figure 1.2-3 identifies the center-point reference to the proposed Power Block location inside a 70-acre land mass, and located at U.S. National Grid (NAD83); longitude: 75° 32' 24.3316"; latitude: 39° 28' 23.7436". Along with the proposed Power Block location, SSAR Figure 1.2-3 depicts two large land masses directly adjacent to the Power Block land mass designated for the construction of plant support equipment, specifically a bounding 25-acre area adjoining the eastern boundary of the proposed Power Block location designated for the new plant switchyard and a bounding 50-acre area adjoining the northern boundary of the proposed Power Block area designated for new safety-related water sources (e.g., cooling towers).

On the basis of its review, the staff finds:

- The information contained in the application is consistent with the requirements of 10 CFR 52.17(a)(1)(x) and provides a sufficient basis to conclude that site characteristics regarding the establishment of security boundaries are such that adequate security plans and measures can be developed.
- Based on the information contained in the application, the postulated plant parameters, which consist of the new plant site center within the 70-acre proposed Power Block land mass enveloped within the PSEG proposed new property line and exclusion area, are sufficiently large enough to allow for the establishment of the security boundaries of the owner controlled area (OCA), protected area (PA), and protected area perimeter isolation zones, with sufficient distance between these security boundaries and vital areas, for the implementation of a physical protection program consistent with the requirements of 10 CFR 73.55.

13.6.4.2 Site Characteristics

In SSAR Chapters 1 and 2, the applicant describes and depicts the site characteristics and potential nearby hazards. Specifically, SSAR Figure 1.2-3 depicts and identifies features of the overall layout of the site, the proposed EAB as well as existing facilities and structures and other manmade features, such as, a proposed barge slip, intake structures, and industrial hazards. In addition, SSAR Figure 1.2-3 identifies the center-point reference to the proposed Power Block location inside a 70-acre land mass, and located at U.S. National Grid (NAD83); longitude: 75° 32' 24.3316"; latitude: 39° 28' 23.7436". Along with the proposed Power Block location, SSAR Figure 1.2-3 depicts two large land masses directly adjacent to the Power Block land mass that are designated for the construction of plant support equipment. Specifically, the figure depicts a bounding 25-acre area adjoining the eastern boundary of the proposed Power Block location designated for the new plant switchyard and a bounding 50-acre area adjoining

the northern boundary of the proposed Power Block area designated for new water sources (e.g., cooling towers).

In SSAR Section 13.6, "Industrial Security," the applicant stated, in part:

The characteristics of the new plant footprint are such that the applicable requirements of the following are met: 10 CFR 73.55, Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage; NRC Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Stations; NEI 03-12, Template for Security Plan and Training and Qualification Plan; EA-03-086, Revised Design Basis Threat Order.

In RAI 3, Question 13.06.03-1, the staff requested that the applicant clarify the requirements referenced in the above quoted statement of the application. In a February 14, 2011, response to RAI 3, Question 13.06.03-1, the applicant clarified that the requirements referenced in SSAR Section 13.6 and as identified in the RAI, are the requirements stated in 10 CFR 73.55, "Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage." The applicant identified that the remaining references listed in SSAR Section 13.6 are NRC and industry guidance to which PSEG will conform.

The staff finds the applicant's February 14, 2011, response to RAI 3, Question 13.06.03-1 acceptable because the applicant clarified the statement identifying the requirements and guidance in SSAR Section 13.6. The applicant committed to revise SSAR Section 13.6 to incorporate clarifying changes in response to RAI 3, Question 13.06.03-1. The staff confirmed that SSAR Revision 1, dated May 21, 2012, was revised as committed in the RAI response. Accordingly, the staff finds the applicant adequately addressed this issue and, therefore, considers RAI 3, Question 13.06.03-1 resolved.

On the basis of its review, the staff finds:

- The information contained in the application is consistent with the requirements stated in 10 CFR 52.17(a)(1)(x), and along with the applicant's response to RAI 3, Question 13.06.03-1, provides sufficient basis to conclude that site characteristics regarding the installation of physical protection equipment and the implementation of a physical protection program are such that adequate security plans and measures can be developed.
- Based on the information contained in the application, the characteristics and topographical features of the PSEG Site will not pose an impediment to the implementation of a physical protection program. The proposed Power Block location inside the 70-acre land mass is of sufficient size for the installation of intrusion detection and assessment equipment, physical barriers, vehicle checkpoints and search areas (sally ports), and will accommodate the implementation of a physical protection program consistent with the requirements of 10 CFR 73.55.

13.6.4.3 Approaches

In SSAR Section 2.2.2.5, "Highways," the applicant described existing approaches or roadways to the PSEG Site. In SSAR Section 2.2.2.6, "Railroads," the applicant addressed railroad lines that are in the vicinity of the site and identified that the closest railroad line is 13.2 km (8.2 mi) to the northeast and there are no plans for expansion at this time.

SSAR Section 2.2.2.7, "Airports, Airways, and Military Training Routes," identifies private airports, helipads, and heliports in the vicinity of the PSEG Site. An existing helipad is owned and operated by PSEG and is located 1172.87 m (3,848 ft) southeast of the proposed 70-acre Power Block location. Operations on the PSEG helipad are limited to medical emergencies and corporate use.

SSAR Chapter 3, "Design of Structures, Components, Equipment, and Systems," Section 3.5.1.6.1, "Airports," identifies eight airports and helipads within 8-16 km (5-10 mi) of the proposed plant location at the PSEG Site, and that the Salem/Hope Creek helipad is located within 8 km (5 mi) of the proposed plant location at the PSEG Site and exists for corporate and emergency use. SSAR Section 3.5.1.6.2, "Military Airports and Routes," indicates that the New Castle County Airport is the closest facility with military operations (Air National Guard), and is located 23.3 km (14.5 mi) northeast of the site. The closest dedicated military facility is Dover Air Force Base, located 38.3 km (23.8 mi) from the PSEG Site.

In RAI 3, Question 13.06.03-2, the staff requested that the applicant address any proposed construction or planning of roadways or approaches to the proposed facility. In a February 14, 2011, response to RAI 3, Question 13.06.03-2, the applicant stated that a new second road in the form of a causeway is proposed for vehicular access to the site. The proposed causeway is conceptually designed as a 48-foot wide elevated structure that extends from the PSEG Site 7.6 km (4.7 mi) towards the northeast along, or adjacent to, the existing Red Lion 500 kV transmission right-of-way to the intersection of Money Island Road and Mason Point Road in Elsinboro Township. The proposed causeway's land approach to the PSEG Site is depicted in SSAR Figure 1.2-3.

The staff finds the applicant's February 14, 2011, response to RAI 3, Question 13.06.03-2 acceptable because the applicant provided additional information regarding proposed roadways or approaches to the PSEG Site, thereby enabling evaluation of the site's proposed roadways or approaches against the applicable requirements in 10 CFR 73.55. The applicant committed to revising SSAR Section 2.2.2.5, "Highways," to incorporate clarifying changes in response to RAI 3, Question 13.06.03-2. The staff confirmed that the SSAR Revision 1, dated May 21, 2012, was revised as committed in the RAI response. Accordingly, the staff finds the applicant adequately addressed this issue and, therefore, considers RAI 3, Question 13.06.03-2, resolved.

SSAR Section 13.6 discusses a modification of current SGS and HCGS Coast Guard agreements to control the area of the Delaware River in the vicinity of these sites, which will address the inclusion of the new plant at the proposed PSEG Site.

In RAI 3, Question 13.06.03-4, the staff requested that the applicant provide information to address all primary and secondary waterways navigable or accessible that provide access to the PSEG Site. In a February 14, 2011, response to RAI 3, Question 13.06.03-4, the applicant stated that the only navigable waterway that provides water access to the PSEG Site is the Delaware River, which runs along the western border of the PSEG Site. SSAR Figure 2.5.1-30, "New Plant Location Aerial Photography," depicts a coastal salt marsh complex comprised of small creeks and tributaries that border the northern and eastern edge of the PSEG Site. In addition, SSAR Figure 2.5.1-30 depicts approximately 11 defined creeks within the 0.96 km (0.6 mi) radius. The creeks generally decrease in width as they approach the vicinity of the proposed 70-acre Power Block area shown on SSAR Figure 1.2-3. The creeks range in width from approximately 9.14 m (30 ft) at the outer radius of SSAR Figure 2.5.1-30 to a width of

approximately 0.6-1.52 m (2-5 ft) for the streams closest to the vicinity of the proposed Power Block. All of these creeks are tidally influenced and most are less than 0.61-0.91 m (2-3 ft) deep at high tide, at low tide, they are essentially mudflats. The characteristics of these creeks and streams are such that traditional navigability is highly limited or nonexistent and accessibility to most of these disbursed channels and creeks would be tidally dependent.

The staff finds the applicant's February 14, 2011, response to RAI 3, Question 13.06.03-4, acceptable because the applicant provided additional detailed information about the navigability of surrounding primary or secondary waterways, thereby enabling evaluation of the site waterways against the applicable requirements of 10 CFR 73.55. Accordingly, the staff considers RAI 3, Question 13.06.03-4 resolved.

In SSAR Section 2.2, "Identification of Potential Hazards in Site Vicinity," the applicant described nearby existing road transportation routes and vehicular land approaches that pose potential risks or hazards to the proposed PSEG Site. The closest primary road providing paved access to the proposed site is New Jersey Highway 49, where sole endpoint access to the proposed PSEG Site will continue on the secondary Alloway Creek Neck Road. The only highway within 5 miles of the PSEG Site is Delaware Route 9, which at its closest point is 4.96 km (3.1 mi) west of the proposed Power Block area. SSAR Figure 1.2-3 and the aerial photograph in ER Figure 2.1-3 do not depict the existence of secondary routes or dirt roads.

Therefore, in RAI 17, Question 13.06.03-6, the staff requested that the applicant identify, characterize, and depict the location of secondary roads, trails and routes leading to the proposed site. In an April 5, 2011, response to RAI 17, Question 13.06.03-6, the applicant stated that SSAR Section 2.2 identifies, characterizes, and depicts the transportation routes within 16 km (10 mi) of the PSEG Site. The applicant also stated that SSAR Section 2.2.1 identifies all transportation routes within 8 km (5 mi) of the PSEG Site and references SSAR Figure 2.2-1, which visually depicts highways, roads, and railroads within 8-16 km (5-10 mi) of the PSEG Site. SSAR Figure 2.2-1 depicts the surrounding public roadways in close proximity to the PSEG Site including Alloway Creek Neck Road, which is the closest public road to the PSEG Site. SSAR Section 2.2.2.5 characterizes Alloway Creek Neck Road as a secondary road that eventually transitions into the dedicated plant access road leading to the PSEG Site. SSAR Figure 1.2-3 depicts onsite roadways designated for operating plant ingress/egress. The onsite roadways are also used by the U.S. Army Corp of Engineers to access the Confined Disposal Facilities north of the PSEG Site via a dirt road traversing the shoreline north of the PSEG Site. Additionally, the applicant stated that aside from the existing access road, there are currently no other secondary roads, trails or routes that provide pedestrian or vehicular access to the PSEG Site.

The staff finds the applicant's April 5, 2011, response to RAI 17, Question 13.06.03-6, acceptable because the applicant confirmed that there are no additional approaches, such as secondary roads, trails and routes, to be included in the evaluation of the site's land approaches other than those described and depicted in the above identified SSAR sections and figures. Accordingly, the staff considers RAI 17, Question 13.06.03-6 resolved.

On the basis of its review, the staff finds:

- The information contained in the application is consistent with the requirements stated in 10 CFR 52.17(a)(1)(x) and, along with the applicant's responses to RAI 3, Question 13.06.03-2; RAI 3, Question 13.06.03-4; and RAI 17, Question 13.06.03-6, provides a sufficient basis to conclude that site characteristics regarding the identification of

approaches to the site that may require security control measures are such that adequate security plans and measures can be developed.

- Based on the information contained in the application, the approaches to the proposed PSEG Site do not present impediments to the implementation of a physical protection program. The approaches to the proposed site (e.g., barge slips, main access road, transportation routes, cliffs, depressions, hills, mounds, open waterways, and trails, roadways or railways) can be addressed and managed through the implementation of a physical protection program consistent with the requirements of 10 CFR 73.55.

13.6.4.4 Industrial Hazards

As to nearby facilities and pipelines that may pose potential hazards to the PSEG Site development of adequate security plans and measures, the applicant states in SSAR Section 13.6, “Based on review of nearby facilities, there are no potential hazards in the vicinity of the PSEG Site.”

In SSAR Section 2.2.2.2, “Pipelines,” the applicant stated: “No natural gas or hazardous liquid pipelines are located within 5 miles of the proposed PSEG site.” Additionally, the nearest gas transmission line runs parallel to U.S. Route 13, and is located 9.5 km (5.9 mi) west of the proposed Power Block area. In a June 17, 2010, teleconference with PSEG, the applicant stated that no new pipelines are currently being considered to be built in the area.

In SSAR Section 2.2, “Identification of Potential Hazards in Site Vicinity,” Tables 2.2-1 through 2.2-22, the applicant provided information on potential hazards at and within 8-16 km (5-10 mi) of the PSEG Site. This includes potential hazards as industrial facilities, chemical storage locations, and transportation routes.

On the basis of its review, the staff finds:

- The information contained in the application is consistent with the requirements stated in 10 CFR 52.17(a)(1)(x), and provides a sufficient basis to conclude that site characteristics about potential industrial hazards to the site are such that adequate security plans and measures can be developed.
- The information contained in the application identifies there is sufficient spatial separation between the proposed PSEG Site and the potential industrial hazards within the vicinity of the site such that the potential industrial hazards do not present impediments that would preclude the implementation of a physical protection program consistent with the requirements of 10 CFR 73.55.

13.6.4.5 Unattended Openings

To evaluate the information about unattended openings that intersect security boundaries, the staff reviewed SSAR Section 2.1, “Geography and Demography”; SSAR Section 13.6, “Industrial Security”; and SSAR Figure 1.2-3 and the aerial photograph in ER Figure 2.1-3 that depict the 70-acre bounding location of the Power Block in which the PSEG Site’s protected area will be established. The staff was unable to locate sufficient information in the SSAR or ER to address unattended openings that intersect a security boundary. Therefore, in RAI 3, Question 13.06.03-5, the staff requested that the applicant provide descriptions and locations of planned or existing culverts or unattended openings. In a February 14, 2011, response to

RAI 3, Question 13.06.03-5, the applicant stated that a reactor technology for the proposed plant at the PSEG Site had not yet been chosen, and that the location and design details on planned culverts and openings associated with the stormwater management systems have not been determined yet. The applicant also confirmed that upon selecting a reactor technology, detailed engineering associated with any designed culverts or openings as part of the site drainage plan will be developed and security attributes of these openings will be addressed in the formal Security Plan developed and submitted as part of the COL application.

Additionally, the applicant stated that the pre-existing culverts and openings relative to the PSEG Site delineated in SSAR Figure 1.2-3 and ER aerial photograph Figure 2.1-3 will be altered or eliminated as part of the excavation process for the new plant. A significant portion of the 70-acre Power Block area, delineated in the Site Utilization Plan shown on SSAR Figure 1.2-3, will be excavated to a depth of 18.29-22.86 m (60-75 ft). The depth of excavation will depend on the selected reactor technology and the final location of safety related structures within the Power Block boundary. This excavation will then be backfilled with structural fill or lean concrete. The scale of this excavation, which is described in SSAR Section 2.5.4.5 and depicted in SSAR Figures 2.5.4.5-1 and 2.5.4.5-2, will significantly alter or eliminate any pre-existing culverts or openings.

The staff finds the applicant's February 14, 2011, response to RAI 3, Question 13.06.03-5, acceptable because the applicant indicated that existing culverts would be altered or eliminated during site excavation. The applicant also confirmed that the security attributes of unattended openings that intersect security boundaries would be addressed within its COL application. The staff maintains that a COL action item is not warranted since the requirement of 10 CFR 73.55(i)(5)(iii) for the protection of unattended openings that intersect a security boundary will be addressed at the COL stage. Accordingly, the staff considers RAI 3, Question 13.06.03-5, resolved.

On the basis of its review, the staff finds:

- The information contained in the applicant's February 14, 2011, response to RAI 3, Question 13.06.03-5, is consistent with the requirements stated in 10 CFR 52.17(a)(1)(x), and provides a sufficient basis to conclude that site characteristics with the proposed alteration or elimination of the existing unattended openings that intersect a security boundary are such that adequate security plans and measures can be developed.
- Based on the information provided in the applicant's February 14, 2011, response to RAI 3, Question 13.06.03-5, in which the applicant confirmed that existing culverts or openings will be altered or eliminated during site excavation and that the security attributes of any planned and designed unattended openings that intersect a security boundary will be addressed in the COL application consistent with the requirements of 10 CFR 73.55, the existing unattended openings do not present an impediment to the implementation of a physical protection program.

13.6.5 Conclusion

As described above, the staff concludes that the applicant provided sufficient technical basis to demonstrate that the site characteristics and potential hazards do not present impediments that would preclude the development of adequate security plans and measures. The staff also concludes that the PSEG Site is such that adequate security plans and measures can be developed consistent with the requirements in 10 CFR 100.21(f).