

Exelon Nuclear (2000-2008), and PSEG Power, LLC (2008-Present). That experience has included positions related to engineering, radiation protection, health physics, waste management, training, regulatory assurance, licensing, and nuclear development.

At PSEG Power, I was the Early Site Permit Manager during the initial phases of the project, including the decision to pursue an Early Site Permit (ESP), vendor selection, application preparation, and responses to Nuclear Regulatory Commission (NRC) requests for additional information. In 2011, I became the Manager of Nuclear Development, which covers the ESP project and other activities related to small modular reactors and advanced nuclear technology.

[DR] My Statement of Professional Qualifications is provided as Exhibit PSEG003. As shown in that document, I have both an A.S. degree in Nuclear Technology and a B.S. degree in Business Administration from Excelsior College.

I have 46 years of experience working on nuclear activities. I started my career as a Machinist Mate in the U.S. Navy (1970-1978). I then worked for General Public Utilities/AmerGen (1978-2008) before joining PSEG Power, LLC (2008-Present). That experience has included positions related to quality assurance, process reengineering, work management planning and implementation, licensing, regulatory assurance, training, emergency preparedness, and nuclear development.

At PSEG Power, I have been the Licensing Lead and Quality Assurance Specialist for the ESP project. In this role, I have been the primary interface with the NRC Safety and Environmental Project Managers, and I have the responsibility for ensuring the quality and accuracy of all submittals to the NRC.

Q3. What is the purpose of your testimony?

A3. [All] The purpose of our testimony is to respond to SER Topic 1, which is one of six pre-filed testimony areas identified by the Atomic Safety and Licensing Board (Board) in its January 27, 2016 Memorandum and Order (Identifying Areas for Prefiled Testimony) and that primarily relate to the *Safety Evaluation of the Early Site Permit Application in the Matter of PSEG Power, LLC and PSEG Nuclear, LLC for the PSEG Early Site Permit Site* (SER), dated September 2015 (Exhibit NRC003). The Board requested the following testimony for SER Topic 1:

As allowed by the Board's Order of December 15, 2015, the NRC Staff has elected to defer its response to SER Question No. 1. Accordingly, the Staff shall address SER Question No. 1 in its prefiled written testimony and exhibits.

As provided in the Board's December 15, 2015 Memorandum and Order (Initial Board Questions and Associated Administrative Directives), SER Question No. 1 in turn requested:

Pursuant to 10 C.F.R. § 52.24(a), in order to authorize issuance of an ESP the Licensing Board must make the following safety findings:

- (1) An application for an early site permit meets the applicable standards and requirements of the [AEA] and the Commission's regulations;
- (2) Notifications, if any, to other agencies or bodies have been duly made;
- (3) There is reasonable assurance that the site is in conformity with the provisions of the Act, and the Commission's regulations;
- (4) The applicant is technically qualified to engage in any activities authorized;
- (5) The proposed inspections, tests, analyses and acceptance criteria, including any on emergency planning, are necessary and sufficient, within the scope of the early site permit, to provide reasonable assurance that the facility has been constructed and will be operated in conformity with the license, the provisions of the Act, and the Commission's regulations; [and]

(6) Issuance of the permit will not be inimical to the common defense and security or to the health and safety of the public

Staff shall briefly summarize those portions of its review that support each of these findings.

The purpose of our testimony is to explain why PSEG Power, LLC and PSEG Nuclear, LLC (collectively, PSEG) have concluded that the NRC can make all of the findings necessary to issue the requested ESP for the PSEG Site. Because this topic was primarily addressed to the NRC Staff, we attempt to be brief and to focus on the findings from the perspective of the applicant and the ESP application (ESPA) (Exhibit PSEG004). Additionally, we briefly discuss the findings that must be made to satisfy the NRC's environmental review for the ESP. PSEG also provided some information relevant to the ESPA and related findings in its responses to the Board's pre-hearing questions on safety and environmental topics. Those responses are provided as Exhibits PSEG005 and PSEG006.

Q4. Please summarize your overall conclusions for this testimony.

A4. [All] We have considered all of the safety and environmental findings that must be made to issue the ESP. We conclude that the ESPA, the NRC's review, and the NRC's documentation all support making those findings, and therefore the NRC can issue the requested ESP.

Q5. Please describe the structure of your testimony.

A5. [All] Section II of our testimony below provides some brief background on the ESPA and the NRC Staff's review. Section III of our testimony then addresses each of the safety findings that apply to the ESPA. Section IV addresses each of the environmental findings that apply to the ESPA. Section V provides PSEG's overall conclusions for this testimony on SER Topic 1.

II. DESCRIPTION OF THE ESP APPLICATION (ESPA)

A. Project Background

Q6. Please briefly describe the ESP project for the PSEG Site.

A6. [All] PSEG submitted an application on May 25, 2010 for an ESP from the NRC under 10 CFR Part 52, Subpart A (Early Site Permits). The ESPA is provided as Exhibits PSEG004A through PSEG004AC. An ESP would provide early resolution of site safety, environmental, and emergency planning issues for one or two additional reactors at the existing PSEG Site. PSEG has requested that the ESP have a duration of 20 years from the date of issuance. PSEG has not sought any limited work authorization as part of the ESPA. An ESP would not authorize any construction of a reactor.

Q7. What type of reactor would be utilized for the PSEG Site?

A7. [All] PSEG has not selected a particular reactor design to be constructed at the site. In order to provide sufficient design information to enable the NRC to determine that the site is suitable for a new plant, PSEG has provided a surrogate design. The surrogate plant is a set of bounding parameters, the plant parameter envelope (PPE). The PPE approach has been accepted in previous ESP applications submitted to the NRC. PSEG used design parameter information from the following reactor designs in the development of the PPE:

- 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)

Q8. Where would the new reactor(s) located?

A8. [All] The PSEG 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, New Jersey. The site is 15 miles south of the Delaware Memorial Bridge; 18 miles south of Wilmington, Delaware; 30 miles southwest of Philadelphia, Pennsylvania; and 7-1/2 miles southwest of Salem, New Jersey. The location selected for the new plant is north of the existing Salem and Hope Creek units.

B. Structure of the ESPA

Q9. Please describe the structure and content of the ESPA for the PSEG Site.

A9. [All] The ESPA (Exhibit PSEG004) contains the information required by 10 CFR 52.17 (Contents of Applications; Technical Information). The structure and content of the ESPA is based upon relevant NRC guidance, including: NUREG-0800, *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition*; RS-002, *Processing Applications for Early Site Permits*; NRC Regulatory Guide 1.70, *Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants*; NRC Regulatory Guide 1.206, *Combined License Applications for Nuclear Power Plants (LWR Edition)*; and NUREG-1555, *Standard Review Plans for Environmental Reviews for Nuclear Power Plants*. The ESPA is organized as follows:

- Part 1: Administrative Information
- Part 2: Site Safety Analysis Report (SSAR)
- Part 3: Environmental Report
- Part 4: Site Redress Plan

- Part 5: Emergency Plan
- Part 6: Sensitive Information

The SSAR contains the following chapters:

- Chapter 1: Introduction
- Chapter 2: Site Characteristics and Site Parameters
- Chapter 3: Design of Structures, Components, Equipment and Systems
- Chapter 11: Radioactive Waste Management
- Chapter 13: Conduct of Operation
- Chapter 15: Transient and Accident Analysis
- Chapter 17: Quality Assurance

The Environmental Report is discussed in more detail in Section IV below.

Q10. Is this structure similar to the structure of prior ESP applications?

A10. [All] Yes. The structure of the ESPA is generally similar to the structure of the applications for ESPs for Clinton, North Anna, Grand Gulf, and Vogtle.

C. NRC Review of the ESPA for the PSEG Site

Q11. Did the NRC Staff document its safety and environmental reviews of the ESPA for the PSEG Site?

A11. [All] Yes. The NRC documented its safety review for the PSEG Site in the SER (Exhibit NRC003) and documented its environmental review for the PSEG Site in NUREG-2168, *Environmental Impact Statement for an Early Site Permit (ESP) at the PSEG Site* (FEIS) (Exhibit NRC004).

Q12. What were the conclusions of the NRC Staff?

A12. **[All]** In SER Chapter 22 (Exhibit NRC003), the Staff concluded that the ESPA satisfies applicable standards and issuance of the requested ESP will not be inimical to the common defense and security or to the health and safety of the public. In FEIS Chapter 10 (Exhibit NRC004B), the Staff concluded that an ESP should be issued for a new nuclear power plant at the PSEG Site.

Q13. Has the Advisory Committee on Reactor Safeguards (ACRS) conducted a review of the ESPA?

A13. **[All]** Yes. The ACRS Regulatory Policies and Practices Subcommittee held multiple meetings with the applicant and Staff and reviewed the ESPA and selected chapters of the associated SER. During these meetings, the Subcommittee had the benefit of discussions with representatives of the NRC Staff and the applicant. The Subcommittee also reviewed a number of referenced documents.

Q14. What were the conclusions of the ACRS?

A14. **[All]** During the 625th meeting of the ACRS, June 10-12, 2015, the ACRS completed its review for the project. The ACRS issued its letter report for the ESPA on June 25, 2015 (provided as Appendix E to the SER (Exhibit NRC003)). The letter states:

- “The staff has done a thorough review of the early site permit application. The effective use of site visits and audits by the staff during this review is noteworthy. Also noteworthy has been effective coordination of the staff review with other Federal agencies including the U.S. Coast Guard, the U.S. Army Corps of Engineers, and the Federal Emergency Management Agency.”
- “Based on our reviews of the application and the staff safety evaluation report, we conclude that the early site permit should be issued.”

III. SAFETY FINDINGS

Q15. What safety findings must the Commission make under 10 CFR Part 52 in order to issue an ESP for the PSEG Site?

A15. **[All]** Under 10 CFR 52.24(a), the Commission may issue an ESP if it finds that:

- The applicable standards and requirements of the Act and the Commission's regulations have been met;
- Any required notifications to other agencies or bodies have been duly made;
- There is reasonable assurance that the site is in conformity with the provisions of the Act, and the Commission's regulations;
- The applicant is technically qualified to engage in any activities authorized;
- Proposed inspections, tests, analyses, and acceptance criteria (ITAAC) are necessary and sufficient, within the scope of the ESP, to provide reasonable assurance that the facility has been constructed and will be operated in conformity with the license, the provisions of the Act, and the Commission's regulations;
- Issuance of the permit will not be inimical to the common defense and security or to the health and safety of the public;
- Any significant adverse environmental impact resulting from activities requested under 10 CFR 52.17(c) can be redressed; and
- The findings required by subpart A of 10 CFR Part 51 have been made.

Q16. What is the Staff's conclusion in the SER regarding the ESP for the PSEG Site?

A16. **[All]** In SER Chapter 22 (Exhibit NRC003), the Staff concluded:

On the basis of its evaluation and its independent analyses as discussed in this safety evaluation report (SER), the staff concludes that the PSEG Site

ESP application satisfies the applicable standards set out in 10 CFR Part 50 “Domestic Licensing of Production and Utilization Facilities” and its appendices and 10 CFR Part 100, “Reactor Site Criteria,” subject to limitations and conditions proposed by the staff in this SER for inclusion in any ESP that might be issued. Further, for the reasons set forth in this SER, the staff concludes that, taking into consideration the applicable requirements of 10 CFR Part 50 and its appendices and 10 CFR Part 100, one or two reactors, having characteristics that fall within the parameters for the site, and which meet the terms and conditions proposed by the staff in this SER, can be constructed and operated without undue risk to the health and safety of the public. The staff also finds that the proposed inspections, tests, analyses, and acceptance criteria (ITAAC) for EP are necessary and sufficient, within the scope of the ESP, to provide reasonable assurance that the facility has been constructed and will be operated in conformity with the license, the provisions of the Atomic Energy Act, and the Commission’s rules and regulations. For the reasons above, the staff also concludes that issuance of the requested ESP will not be inimical to the common defense and security or to the health and safety of the public.

Additionally, as discussed in the next section of our testimony, the environmental findings required by 10 CFR Part 51 have been met.

Q17. Are the findings in 10 CFR 52.24(a) met for the ESP?

A17. [All] Yes. The ESPA and the corresponding NRC Staff SER fully support all of the safety findings that must be made in Section 52.24(a) to issue the requested ESP for the PSEG Site. We address each of the safety findings in more detail below.

A. 10 CFR 52.24(a)(1) (“An application for an early site permit meets the applicable standards and requirements of the Act and the Commission’s regulations”)

Q18. Please discuss whether the applicable standards and requirements of the Act and the Commission’s regulations have been met by the ESPA for the PSEG Site.

A18. [All] The ESPA (Exhibit PSEG004) for the PSEG Site meets the applicable standards and requirements of the Atomic Energy Act of 1954, as amended (Act) and the Commission’s regulations. The ESPA addresses all relevant NRC regulations for

issuance of an ESP, including those in 10 CFR Parts 20 (Standards for Protection Against Radiation), 50 (Domestic Licensing of Production and Utilization Facilities), 51 (Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions), 52 (Licenses, Certifications, and Approvals for Nuclear Power Plants), 73 (Physical Protection of Plants and Materials), and 100 (Reactor Site Criteria).

As noted above, the ESPA also was prepared based on relevant NRC guidance, including NUREG-0800, *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition* (SRP); RS-002, *Processing Applications for Early Site Permits*; NRC Regulatory Guide 1.70, *Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants*; NRC Regulatory Guide 1.206, *Combined License Applications for Nuclear Power Plants (LWR Edition)*; Interim Staff Guidance (ISG); other Regulatory Guides; Bulletins; Generic Letters; and other NUREGs.

The NRC Staff reviewed the ESPA and evaluated it against the applicable regulations, including those in 10 CFR Parts 20, 50, 51, 52, 73, and 100. The NRC Staff considered applicable portions of the SRP, ISGs, Regulatory Guides, Bulletins, Generic Letters, and other NUREGs. Based on the ESPA and the NRC Staff's review, documented in the SER, PSEG concludes that, for the purpose of issuing the ESP for the PSEG Site, the applicable standards and requirements of the Act and the Commission's regulations have been met.

Q19. Did the NRC Staff reach a conclusion on whether the applicable standards and requirements of the Act and the Commission's regulations have been met by the ESPA for the PSEG Site?

A19. [All] Yes. As discussed in SER Chapter 22 (Conclusions), the Staff also has concluded that the applicable standards and requirements in the Commission's regulations have been met.

Q20. Do you agree with the NRC Staff's conclusion?

A20. [All] Yes.

B. 10 CFR 52.24(a)(2) ("Notifications, if any, to other agencies or bodies have been duly made")

Q21. Has the NRC Staff made the required notifications to other agencies or bodies with respect to the ESPA?

A21. [All] Yes. PSEG understands that the NRC Staff has made any required notifications to other agencies or bodies with respect to the ESPA for the PSEG Site. As discussed in the FEIS (Exhibit NRC004A), Volume 1, page iii, the NRC consulted with Federal, State, Tribal, and local agencies on the ESPA, and published notice of the ESPA (*i.e.*, in local newspapers and the *Federal Register*).

C. 10 CFR 52.24(a)(3) ("There is reasonable assurance that the site is in conformity with the provisions of the Act, and the Commission's regulations")

Q22. Please discuss whether there is reasonable assurance that the PSEG Site is in conformity with the provisions of the Act, and the Commission's regulations.

A22. [All] There is reasonable assurance that the PSEG Site is in conformity with the provisions of the Act and the Commission's regulations. PSEG provided information, analysis, and conclusions, primarily in the SSAR, regarding site-specific conditions, including geography and demography of the site; nearby industrial, transportation, and military facilities; site meteorology; site hydrology; and site geology, seismology, and

geotechnical engineering to ensure that the PSEG Site is in conformance with the provisions of the Act and the Commission's regulations. In addition to a review of that information, PSEG also evaluated aircraft hazards, liquid and gaseous radioactive releases, emergency planning, and accidents.

Q23. Did the NRC Staff reach a conclusion on whether the PSEG Site is in conformity with the provisions of the Act, and the Commission's regulations?

A23. [All] Yes. As discussed in SER Chapter 22 (Conclusions) (Exhibit NRC003), the Staff has concluded that the ESPA satisfies the applicable standards set out in the NRC regulations, subject to the limitations and conditions proposed by the Staff in the SER. Additionally, as stated in the SER, Subsection 2.1.1.5, page 2-4, the Staff concluded that PSEG established site characteristics and design parameters acceptable to meet the requirements of 10 CFR 52.17(a)(1), 10 CFR 100.3, and the radiological consequence evaluation factors in 10 CFR 50.34(a)(1). The Staff also affirmed that PSEG provided sufficient details about the PSEG site location and site area, as documented in SSAR Subsections 2.1.2 (Exclusion Area Authority and Control), 2.1.3 (Population Distribution), and 13.3 (Emergency Planning) and SSAR Chapter 15 (Transient and Accident Analysis) (Exhibits PSEG004B and PSEG004R). These details allowed the Staff to conclude that PSEG met the requirements in 10 CFR 52.17(a)(1) and 10 CFR Part 100 regarding site location and description.

Q24. Do you agree with the NRC Staff's conclusion?

A24. [All] Yes.

D. 10 CFR 52.24(a)(4) (“The applicant is technically qualified to engage in any activities authorized”)

Q25. Please discuss whether the applicants are technically qualified to engage in any activities to be authorized by the ESP.

A25. [All] The applicants are technically qualified to engage in the activities that would be authorized by the ESP for the PSEG Site. As discussed in SSAR Subsection 1.4.1 (Applicant) (Exhibit PSEG004B), PSEG Power, LLC is a Delaware limited liability company, which is wholly owned by Public Service Enterprise Group, Incorporated, a corporation formed under the laws of the State of New Jersey. PSEG Nuclear, LLC is a Delaware limited liability company formed to own and operate nuclear generating stations and is a wholly owned subsidiary of PSEG Power, LLC. PSEG Nuclear, LLC is the owner and licensed operator of the Hope Creek Generating Station and the partial owner and licensed operator of the Salem Nuclear Generating Station, Units 1 and 2. PSEG has over 38 years of commercial operations experience with Salem Units 1 and 2 and the Hope Creek unit. As stated in SSAR Subsection 1.4.1.1, it is anticipated that PSEG Nuclear, LLC will be the licensed operator of the new plant at the PSEG Site. Accordingly, PSEG is technically qualified to engage in activities related to commercial nuclear power plants, including any activities authorized by the ESP for the PSEG Site.

E. **10 CFR 52.24(a)(5) (“The proposed inspections, tests, analyses and acceptance criteria, including any on emergency planning, are necessary and sufficient, within the scope of the early site permit, to provide reasonable assurance that the facility has been constructed and will be operated in conformity with the license, the provisions of the Act, and the Commission’s regulations”)**

Q26. **Please discuss whether the ITAAC are necessary and sufficient as required by Section 52.24(a)(5).**

A26. [All] The proposed ITAAC, including those on emergency planning, are necessary and sufficient, within the scope of the ESP, to provide reasonable assurance that the facility has been constructed and will be operated in conformity with the license, the provisions of the Act, and the Commission’s regulations.

PSEG proposed ITAAC related to emergency planning in the ESPA, Part 5, Emergency Plan, Attachment 10, Emergency Planning-Inspections, Tests, Analyses, and Acceptance Criteria (EP-ITAAC) (Exhibit PSEG004AC). These EP-ITAAC are reproduced in SER Appendix A (Permit Conditions, COL Action Items, Site Characteristics, Bounding Design Parameters, and Inspections, Tests, Analyses, and Acceptance Criteria), Section A.5.1 (ITAAC for the ESP) (Exhibit NRC003). These EP-ITAAC are the only ITAAC that are applicable to a plant parameter envelope-based ESPA. The EP-ITAAC address the relevant standards and requirements for emergency plans set forth in 10 CFR 50.47(b) and Part 50, Appendix E (Emergency Planning and Preparedness for Production and Utilization Facilities), including requirements related to the emergency classification system, notification methods and procedures, emergency communications, public education and information, emergency facilities and equipment, accident assessment, protective response, exercises and drills, and implementing procedures.

Q27. Did the NRC Staff reach a conclusion on the proposed ITAAC?

A27. [All] Yes. As discussed in SER Chapter 22 (Conclusions), the Staff has concluded that the proposed EP-ITAAC are necessary and sufficient, within the scope of the ESP, to provide reasonable assurance that the facility has been constructed and will be operated in conformity with the license, the provisions of the Act, and the Commission's rules and regulations.

Q28. Do you agree with the NRC Staff's conclusion?

A28. [All] Yes.

F. 10 CFR 52.24(a)(6) ("Issuance of the permit will not be inimical to the common defense and security or to the health and safety of the public")

Q29. Please discuss whether the issuance of the ESP will be inimical to the common defense and security or to the health and safety of the public.

A29. [All] Issuance of the ESP would not be inimical to the common defense and security or to the health and safety of the public. As discussed above, PSEG provided information, analysis, and conclusions regarding site-specific conditions, including geography and demography of the site; nearby industrial, transportation, and military facilities; site meteorology; site hydrology; and site geology, seismology, and geotechnical engineering to ensure that issuance of the permit will not be inimical to public health and safety. In addition to a review of that information, PSEG also evaluated aircraft hazards, liquid and gaseous radioactive releases, emergency planning, and accidents. PSEG has confirmed that radiological releases and human doses during both normal operation and design basis accident scenarios will remain within regulatory limits. PSEG has further considered

emergency planning for the PSEG site. These evaluations support a conclusion that issuance of the ESP will not be inimical to public health and safety.

Additionally, the applicants for the ESP are U.S. companies that already own and operate nuclear power plants, and the physical security to be implemented at the PSEG Site for any future reactors is adequate to protect the facility. These issues provide further support for the conclusion that issuance of the ESP will not be inimical to the common defense and security.

Q30. Did the NRC Staff make an overall inimicality finding?

A30. [All] Yes. As discussed in SER Chapter 22 (Conclusions), the Staff also has concluded that the issuance of the ESP for the PSEG Site will not be inimical to the common defense and security or to public health and safety.

Q31. Do you agree with the NRC Staff's conclusion?

A31. [All] Yes.

G. 10 CFR 52.24(a)(7) (“Any significant adverse environmental impact resulting from activities requested under § 52.17(c) can be redressed”)

Q32. Has PSEG requested any activities under 10 CFR 52.17(c)?

A32. [All] No. 10 CFR 52.17(c) allows ESP applicants to request that limited work authorization under 10 CFR 50.10 be issued in conjunction with an ESP. PSEG has not requested any limited work authorization as part of the ESPA. Therefore, the finding under 10 CFR 52.24(a)(7) is not applicable.

H. **10 CFR 52.24(a)(8) (“The findings required by subpart A of part 51 have been made”)**

Q33. Please discuss whether the NRC Staff’s review has been adequate to support the findings set forth in 10 CFR 51.105(a).

A33. [All] As discussed in the sections below, the NRC Staff’s environmental review has been adequate to support the findings set forth in 10 CFR 51.105(a).

IV. ENVIRONMENTAL FINDINGS

Q34. Please describe the regulatory requirements applicable to the Environmental Report (ER) for the ESPA.

A34. [All] The regulatory requirements for an ER for an ESPA are contained in 10 CFR 51.50(b), which in turn references Sections 51.45, 51.51, and 51.52. In summary, those regulations require an ER to include a description of: the proposed action and its purposes; the environment affected and the impact of the proposed action on the environment; alternatives to the proposed action; the relationship between local short-term uses of man’s environment and the maintenance and enhancement of long-term productivity; any irreversible and irretrievable commitments of resources; and the benefits and costs of the proposed action and its alternatives. Additionally, an ER must discuss the status of permits, licenses, and approvals from other agencies connected with the proposed action.

Q35. Please describe the content of the ER for the PSEG Site.

A35. [All] The ER (Exhibits PSEG004S to PSEG004AB) contains the following 10 Chapters:

- Chapter 1: Introduction, including a discussion of the status of reviews, approvals, and consultations of other agencies

- Chapter 2: Environmental Description
- Chapter 3: Plant Description
- Chapter 4: Environmental Impacts of Construction
- Chapter 5: Environmental Impacts of Operation
- Chapter 6: Environmental Measurements and Monitoring Programs
- Chapter 7: Environmental Impacts of Postulated Accidents Involving Radioactive Materials
- Chapter 8: Need for Power
- Chapter 9: Alternatives
- Chapter 10: Environmental Consequences of the Proposed Action, including a discussion of the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, any irreversible and irretrievable commitments of resources, and the benefits and costs of the proposed action and its alternatives

Q36. Please discuss whether the ER for the PSEG Site satisfies the requirements of 10 CFR Part 51.

A36. **[All]** The ER for the PSEG Site meets all of the requirements of 10 CFR Part 51, including those in 10 CFR 51.45, 51.50(b), 51.51 and 51.52.

Q37. What conclusions does the ER make regarding unavoidable adverse environmental impacts?

A37. **[All]** Unavoidable impacts are addressed in ER Chapters 4 and 5 (Exhibits PSEG004Z and PSEG004AA) and summarized in ER Section 10.1 (Exhibit PSEG004AB). Based on the analysis contained in the ER, all of the unavoidable impacts were determined to be SMALL, except for a few preconstruction/construction impacts related to offsite land use impacts and potential impacts to historic properties for the causeway and potential

transmission corridor (MODERATE), ecological impacts to wetlands (MODERATE), impacts to terrestrial ecosystems (MODERATE), and traffic (MODERATE).

Q38. What conclusions does the ER for the PSEG Site make regarding need for power?

A38. [All] Chapter 8 of the ER (Exhibit PSEG004AB) concludes that there will be a substantial need for power not only from a new power plant at the PSEG Site, but from other new generating plants as well.

Q39. What conclusions does the ER for the PSEG Site make regarding alternatives to the project?

A39. [All] Chapter 9 of the ER (Exhibit PSEG004AB) evaluates the following types of alternatives:

- No-Action Alternative
- Energy Alternatives
- Alternative Sites
- Alternative Plant and Transmission Systems

The ER makes the following conclusions:

- In light of the benefits of the proposed project, the no-action alternative is not preferable to the construction and operation of a new plant at the PSEG Site.
- None of the energy alternatives is considered to be environmentally preferable to the proposed action.
- No alternative site is environmentally preferable to the proposed PSEG Site; accordingly, no alternative site is obviously superior to the PSEG Site.
- No environmentally preferable alternatives were identified to the proposed plant systems design.

Q40. What conclusions does the ER for the PSEG Site make regarding irreversible and irretrievable commitments of resources?

A40. [All] ER Section 10.2.2 (Exhibit PSEG004AB) makes the following conclusions regarding irreversible and irretrievable commitments of resources:

- Irretrievable commitments of resources during new plant construction are generally similar to that of any major, multi-year, construction project.
- The amounts of materials for construction are typical of other types of power plants (*e.g.*, hydroelectric and coal-fired plants) and other large industrial facilities (*e.g.*, refineries and manufacturing plants) that are constructed throughout the United States, and have a SMALL impact with respect to the availability of such resources.
- During operations, the main resources that are irreversibly and irretrievably committed are the uranium used as fuel, which has a negligible impact on the long-term availability of uranium worldwide, and the energy required to produce the fuel.
- While a given quantity of material consumed during new plant construction and operation at the PSEG Site is irretrievable, except for materials recycled during decommissioning, the impact on their availability is SMALL.

Q41. What conclusions does the ER for the PSEG Site make regarding the relationship between short-term uses and long-term productivity of the human environment?

A41. [All] The impacts resulting from the new plant construction and operation at the PSEG Site result in both adverse and beneficial short-term impacts. The principal short-term adverse impacts are SMALL residual impacts (after mitigation measures are

implemented) to land use, aquatic biota, local traffic, and air quality. There are no long-term impacts to the environment. The principal short-term benefits are the production of electrical energy, creation of additional jobs, additional tax revenues to taxing jurisdictions, and improvements to local infrastructure and social services. The principal long-term benefit is the continued availability of the improved infrastructure, particularly in Salem County, after plant decommissioning. The short-term impacts and benefits and long-term benefits do not affect long-term productive use of the PSEG Site.

Q42. What is the overall conclusion in the ER for the PSEG Site regarding the benefits and costs of the proposed project?

A42. [All] The costs and benefits of the project are summarized in ER Table 10.4-2 (Exhibit PSEG004AB). The primary benefits are generation of electricity, generating capacity, fuel diversity, emission reductions, tax payments, local economy, and licensing certainty. The primary costs are the economic costs of construction and operation, land use, and use of materials. Based upon this table, PSEG concludes that the benefits of the project outweigh the costs.

Q43. What environmental findings must the Commission make under 10 CFR Part 51 in order to issue the ESP for the PSEG Site?

A43. [All] Under 10 CFR 51.105(a), the Commission must do the following for an uncontested proceeding:

- Determine whether the requirements of Sections 102(2) (A), (C), and (E) of the National Environmental Policy Act (NEPA) and the regulations in Part 51 have been met;

- Independently consider the final balance among conflicting factors contained in the record of the proceeding with a view to determining the appropriate action to be taken;
- Determine, after weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering reasonable alternatives, whether the ESP should be issued, denied, or appropriately conditioned to protect environmental values; and
- Determine whether the NEPA review conducted by the NRC Staff has been adequate.

Q44. Are the findings in 10 CFR 51.105(a) met for the PSEG Site?

A44. [All] Yes, as discussed in more detail below.

A. 10 CFR 51.105(a)(1) (“Determine whether the requirements of Sections 102(2) (A), (C), and (E) of NEPA and the regulations in this subpart have been met”)

Q45. Please describe the NRC Staff’s environmental review process for the ESPA and whether it utilized a systematic, interdisciplinary approach.

A45. [All] The Staff prepared the FEIS (Exhibit NRC004) for the PSEG Site based on its independent assessment of the information in the ER and other information provided by the applicants. The Staff also developed some of the information in the FEIS independently, such as through visiting the site and consultation with other agencies. The Staff’s technical analysis used a systematic, interdisciplinary approach to integrate information from many fields, including use of individuals experienced in the fields of hydrology, aquatic ecology, air quality, terrestrial ecology, socioeconomics, historic and

cultural resources, radiation protection, and accidents, as listed in Appendix A to the FEIS.

Q46. Please discuss whether the FEIS for the PSEG Site discusses the environmental impacts of the project, any adverse environmental effects that cannot be avoided, alternatives, the relationship between local short term uses of man's environments and the maintenance of long-term productivity, and any irreversible and irretrievable commitments of resources.

A46. [All] As required by NEPA, the FEIS for the PSEG Site addressed (1) the environmental impact of the proposed action (Chapters 4 through 7 of the FEIS); (2) unavoidable adverse environmental effects (Section 10.2 of the FEIS); (3) alternatives to the proposed action (Chapter 9 of the FEIS); (4) the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity (Section 10.3 of the FEIS); and (5) irreversible and irretrievable commitments of resources that would be involved in the proposed action should it be implemented (Section 10.4 of the FEIS).

Q47. Did the NRC Staff consult with other agencies in preparing the FEIS for the PSEG Site?

A47. [All] Yes. The U.S. Army Corps of Engineers participated as a cooperating agency in preparing the FEIS for the PSEG Site. The Staff also consulted with and received comments from other State and Federal agencies, such as the U.S. Fish and Wildlife Service, New Jersey State Historic Preservation Office, N.J. Department of Environmental Protection, and National Marine Fisheries Service. This correspondence is described in Appendix F to the FEIS (Exhibit NRC004C).

Q48. Please discuss whether the requirements of Sections 102(2) (A), (C), and (E) of NEPA and the regulations in Subpart A of 10 CFR Part 51 have been met with respect to the ESPA for the PSEG Site.

A48. [All] Based upon our answers to the previous questions, we conclude that the requirements of Sections 102(2) (A), (C), and (E) of NEPA and the regulations in Part 51 have been met with respect to the ESPA for the PSEG Site.

B. 10 CFR 51.105(a)(2) (“Independently consider the final balance among conflicting factors contained in the record of the proceeding with a view to determining the appropriate action to be taken”)

Q49. Please discuss whether the NRC Staff has independently considered the final balance among conflicting factors contained in the record of the proceeding with a view to determining the appropriate action to be taken with respect to the ESP.

A49. [All] In FEIS Section 10.6 (Exhibit NRC004B), the NRC Staff provides its summary for the cost-benefit balancing for the ESP. The Staff concluded that the accrued benefits would outweigh the costs of construction and operation of a new nuclear power plant at the PSEG Site.

Q50. Do you agree with the conclusions of the NRC Staff on this factor?

A50. [All] Yes. PSEG concludes that the benefits of the project outweigh the costs.

C. **10 CFR 51.105(a)(3) (“Determine, after weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering reasonable alternatives, whether the . . . early site permit should be issued, denied, or appropriately conditioned to protect environmental values”)**

Q51. Please discuss whether the NRC Staff has weighed the environmental, economic, technical, and other benefits against environmental and other costs with respect to the PSEG Site.

A51. [All] Based on the assessments summarized in the FEIS Section 10.6.3 (Exhibit NRC004B), the NRC Staff concluded that the accrued benefits would outweigh the costs of construction and operation of a new nuclear power plant at the PSEG Site.

Q52. Please discuss whether the NRC Staff has considered reasonable alternatives with respect to a new nuclear power plant at the PSEG Site.

A52. [All] The alternatives considered in FEIS Chapter 9 (Exhibit NRC004B) included the no-action alternative, energy alternatives, alternative sites, and system design alternatives. The FEIS demonstrates that the NRC Staff adequately considered alternatives to the proposed action, consistent with the requirements of NEPA.

Q53. Please discuss whether the NRC Staff has determined whether the ESP should be issued, after weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering reasonable alternatives.

A53. [All] As discussed in FEIS Section 10.7 (Exhibit NRC004B), the NRC Staff’s recommendation to the Commission related to the environmental aspects of the proposed action is that the ESP should be issued. The Staff’s recommendation is based on (1) the ER submitted by PSEG, (2) consultation with Federal, State, Tribal, and local agencies,

(3) the NRC's own independent review, (4) the Staff's consideration of public comments, and (5) the assessments summarized in the FEIS.

Q54. Do you agree with the conclusions of the NRC Staff on this factor?

A54. [All] Yes.

D. 10 CFR 51.105(a)(4) ("Determine, in an uncontested proceeding, whether the NEPA review conducted by the NRC staff has been adequate")

Q55. Please discuss whether the NRC Staff's NEPA review has been adequate with respect to the PSEG site.

A55. [All] The Staff's NEPA review was adequate. The Staff conducted an independent evaluation of the application that consumed over five years and issued many questions in environmental Requests for Additional Information. The NRC Staff developed independent, reliable information and conducted a systematic, interdisciplinary review of the potential impacts of the proposed action on the environment and reasonable alternatives to the proposed action. The NRC Staff considered the purpose of and need for the proposed action, the environment that could be affected by the action, and the consequences of the proposed action, including mitigation that could reduce impacts. The FEIS considered whether there is a need for the additional generating capacity that could be supplied by reactors stemming from the ESP. The FEIS compared the alternatives to the proposed action. The NRC Staff considered the adverse environmental effects that could not be avoided should the proposed action be implemented, the relationship between short-term uses of the human environment and the maintenance and enhancement of long-term productivity, and irreversible or irretrievable commitments of resources that would be involved in the proposed project.

Q56. Please discuss whether the NRC Staff’s environmental review for the PSEG Site followed NRC regulations and guidance, as well as the approach used for prior ESPs.

A56. [All] As discussed on page 1-3 of the FEIS (Exhibit NRC004A) for the PSEG Site, the NRC Staff used the detailed procedures in its Environmental Standard Review Plan (NUREG-1555), as well as other guidance, for conducting its environmental review. NUREG-1555 implements the relevant regulations in 10 CFR Part 51 for environmental impact statements. The Staff has also used NUREG-1555 for preparing the environmental impact statements for the other ESPs issued to date, and the format and level of detail of the FEIS for the PSEG Site is similar to the format and level of detail of those previous environmental impact statements.

Q57. Did the NRC Staff’s review satisfy NEPA?

A57. [All] Yes. As I have discussed in my previous answers, the Staff’s review satisfied Sections 102(2) (A), (C), and (E) of NEPA. Additionally, by implementing the detailed procedures in NUREG-1555 and the regulations in 10 CFR Part 51, the NRC Staff’s review ensured compliance with NEPA. The FEIS is more than a thousand pages long, and takes the requisite “hard look” at the PSEG Site.

Q58. Was the public permitted to participate in the environmental review process for the PSEG Site?

A58. [All] Yes. At the start of the environmental review, the NRC Staff issued a notice of intent to prepare the FEIS and invited the public to provide any information relevant to the environmental review, including holding public scoping meetings on November 4, 2010. The NRC also provided opportunities for governmental and general public

participation during the public meeting on the draft environmental impact statement (DEIS) and sought, received, and responded to the comments on the DEIS from the public. Those responses are documented in Appendix E of the FEIS (Exhibit NRC004C).

Q59. What are your overall conclusions regarding the NRC Staff's environmental review for the PSEG Site?

A59. [All] The NRC Staff conducted a thorough and complete environmental review for the ESP for the PSEG Site. That review has been sufficient to meet the requirements of NEPA.

V. CONCLUSIONS

Q60. What are your overall safety conclusions regarding issuance of the ESP?

A60. [All] The ESPA contains sufficient information to demonstrate compliance with the applicable standards and requirements in the Act and the Commission's regulations. There is reasonable assurance that the PSEG Site is in conformity with the provisions of the Act, and the Commission's regulations. Based on the record, PSEG is technically qualified to engage in any activities authorized. The proposed ITAAC are necessary and sufficient. Issuance of the ESP for the PSEG Site will not be inimical to the common defense and security or the health and safety of the public. Furthermore, the review of the ESPA by the NRC Staff has been adequate to support these conclusions.

Q61. What are your overall environmental conclusions regarding issuance of the ESP?

A61. [All] The environmental review conducted by the NRC Staff pursuant to 10 CFR Part 51 has been adequate; the requirements of Sections 102(2) (A), (C), and (E) of NEPA have been satisfied; an independent weighing and balancing of the environmental, technical,

and other costs and benefits of the project support issuance of the ESP; and the requested ESP should be issued.

Q62. Does the ESPA for the PSEG Site, and the NRC Staff's review of the ESPA, satisfy the requirements for issuance of the ESP?

A62. [All] Yes.

Q63. Does this conclude your testimony?

A63. [All] Yes.

We certify that this written testimony was prepared by us or under our direction, and we adopt the testimony as our sworn testimony in this proceeding.

We declare under penalty of perjury that the foregoing written testimony is true and correct to the best of our information, knowledge, and belief.

Executed on February 25, 2016.

Executed in Accord with 10 CFR § 2.304(d)

/s/ James Mallon

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