

**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**

U. S. Nuclear Regulatory Commission
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ABSTRACT

This safety evaluation report¹ (SER) documents the U.S. Nuclear Regulatory Commission (NRC) staff's technical review of the site safety analysis report (SSAR) and emergency planning information included in the early site permit (ESP) application submitted by PSEG Power, LLC and PSEG Nuclear, LLC (PSEG or the applicant), for the proposed PSEG Site, in Salem County, New Jersey. Since the applicant did not apply for a limited work authorization (LWA), this SER does not include a technical review for an LWA.

In a May 25, 2010, letter, PSEG submitted an ESP application for the PSEG Site in accordance with 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." The proposed 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 24.1 kilometers (km) (15 miles (mi)) south of the Delaware Memorial Bridge, 28.97 km (18 mi) south of Wilmington, Delaware, 48.2 km (30 mi) southwest of Philadelphia, Pennsylvania, and 12.1 km (7.5 mi) southwest of Salem, New Jersey. The other nuclear facilities licensed by the NRC and located adjacent to this site are Salem Generating Station (SGS) Units 1 and 2 and Hope Creek Generating Station (HCGS) Unit 1.

PSEG has not selected a specific reactor technology, but used a plant parameter envelope (PPE) in developing its application. PSEG used technical information from various reactor designs to develop bounding parameters (i.e., PPE) that are 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.

In its application, PSEG seeks an ESP that could be referenced as part of a future application to construct and operate a nuclear plant at the PSEG Site. In order to utilize the finality on issues resolved in the ESP proceeding, a future application to build a plant on the PSEG Site may be for any of the reactor designs identified or a different design that falls within the site characteristics and design parameters set out in the ESP. According to the PPE, the bounding new plant will have a total nuclear generating capacity of 4,614 megawatts thermal (MWt) for a single unit or 6,830 MWt for a dual unit, with a capability of producing up to approximately 2,200 megawatts electric (MWe) net of electrical power. A future plant built on the PSEG Site would be built adjacent to and north of the existing SGS/HCGS units operated by PSEG Nuclear, LLC.

This SER presents the results of the staff's review of site safety analysis information submitted in conjunction with the ESP application. Appendix A to this SER identifies the proposed permit conditions, site characteristics, bounding design parameters, and inspections, tests, analyses and acceptance criteria (ITAAC) that the staff recommends be imposed, should an ESP be issued to the applicant. Appendix A to this SER also includes certain site related items (Combined License (COL) action items) that will need to be addressed at the COL or construction permit (CP) stage, should the applicant later apply to construct a new nuclear plant on the PSEG Site and references the PSEG Site ESP in its application. The staff concluded

¹ This SER documents the NRC staff's position on all safety issues associated with the early site permit application. This SER has undergone a final review by the Advisory Committee on Reactor Safeguards (ACRS), and the results of the ACRS review are in a final letter report provided by the ACRS. This report is included as Appendix E to this SER.

that addressing these items is not required for the staff to make its regulatory findings at the ESP stage and that, for reasons specified in Section 1.6, “Summary of Combined License Action Items,” of this SER, the COL action items are more appropriately addressed when the applicant has applied for a COL or CP.

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In accordance with U.S. Nuclear Regulatory Commission Review Standard (RS)-002, "Processing Applications for Early Site Permits," the chapter and section layout of this safety evaluation report is consistent with the format of (1) NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," (2) Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants," and (3) the applicant's site safety analysis report (SSAR). Numerous chapters and sections in the NUREG-0800 are not within the scope of, or addressed in, an early site permit (ESP) proceeding. The reader will, therefore, note these chapters and sections are not included in this document. The subjects of chapters and sections in NUREG-0800 not addressed herein will be addressed, as appropriate and applicable, in other regulatory actions (design certifications, construction permit, or combined license) for a plant that might be constructed on the PSEG Site.

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EXECUTIVE SUMMARY

The regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants,” contain requirements for licensing new nuclear power plants.² These regulations include the U.S. Nuclear Regulatory Commission (NRC) requirements for early site permits (ESPs), design certifications (DCs), and combined operating licenses (COLs). The ESP process discussed in 10 CFR Part 52, Subpart A, “Early Site Permits,” is intended to address and resolve site-related issues. The DC process (10 CFR Part 52, Subpart B, “Standard Design Certifications”) provides a means for a vendor to obtain NRC certification of a particular reactor design. Finally, the COL process (10 CFR Part 52, Subpart C, “Combined Licenses”) allows an applicant to seek NRC authorization to construct and operate a new nuclear power plant. A COL applicant may reference an ESP, a certified design, both, or neither. A COL applicant referencing an ESP or certified design must resolve licensing issues that were not resolved as part of the referenced ESP or design certification proceeding before the NRC can issue a COL.

This safety evaluation report (SER) describes the results of a review by the NRC staff (the staff) of an ESP application submitted by PSEG for the proposed PSEG Site. The staff’s review verified the applicant’s compliance with the requirements of 10 CFR Part 52, Subpart A and other requirements referenced therein. This SER serves to identify the staff’s conclusions with respect to the ESP safety review and to identify items to be addressed by a future COL applicant referencing the PSEG Site ESP. This SER also identifies the staff’s conclusions with respect to the Fukushima Near-Term Task Force (NTTF) Recommendations that are applicable to, or expected of, an ESP applicant to address, or be voluntarily addressed by PSEG.

The NRC regulations also contain requirements for an applicant to submit an environmental report pursuant to 10 CFR Part 51, “Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions.” The staff reviews the environmental report as part of the responsibilities under the National Environmental Policy Act of 1969, as amended. The staff presents the results of that review in a final environmental impact statement (FEIS), which is a report separate from this SER. The FEIS is provided to the U.S. Environmental Protection Agency (EPA). Upon publication, the staff’s FEIS, NUREG-2168, “Final Environmental Impact Statement for an Early Site Permit (ESP) at the PSEG Site,” for the ESP application can be accessed through the Agencywide Documents Access and Management System (ADAMS)³ Accession No. ML15176A444.

² Applicants may also choose to seek a CP and operating license in accordance with 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities,” instead of using the 10 CFR Part 52 process.

³ ADAMS (Agencywide Documents Access and Management System) is the NRC information system that provides access to all image and text documents that the NRC has made public since November 1, 1999, as well as bibliographic records (some with abstracts and full text) that the NRC made public before November 1999. Documents available to the public may be accessed via the Internet at <http://www.nrc.gov/reading-rm/adams.html>. Documents may also be viewed by visiting the NRC Public Document Room at One White Flint North, 11555 Rockville Pike, Rockville, Maryland (MD). Telephone assistance for using web-based ADAMS is available at (800) 397-4209 between 8:30 a.m. and 4:15 p.m., Eastern Time, Monday through Friday, except Federal holidays. The staff is also making this SER available on the NRC new reactor licensing public web site at <http://www.nrc.gov/reactors/new-reactors/esp/pseg.html>.

In a May 25, 2010, letter, PSEG submitted an ESP application (ADAMS Accession No. ML101480484) for the PSEG Site. 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 (NJ). The site is 24.1 kilometers (km) (15 miles (mi)) south of the Delaware Memorial Bridge, 28.97 km (18 mi) south of Wilmington, Delaware (DE), 48.2 km (30 mi) southwest of Philadelphia, Pennsylvania (PA), and 12.1 km (7.5 mi) southwest of Salem, NJ. Nuclear facilities licensed by the NRC and located adjacent to the PSEG Site are Salem Generating Station (SGS), Units 1 and 2, and Hope Creek Generating Station (HCGS), Unit 1.

In accordance with 10 CFR Part 52, the PSEG Site ESP application includes, among other information: (1) a description of the site and nearby areas that could affect or be affected by a nuclear power plant(s) located at the site; (2) a safety assessment of the site on which the facility would be located, including an assessment of the major structures, systems, and components (SSCs) that bear significantly on the acceptability of the site; (3) an assessment of any impediments to implementing an emergency plan at the PSEG Site, and a complete and integrated emergency plan with inspections, tests, analyses, and acceptance criteria (ITAAC); and (4) the quality assurance program under which ESP-related activities were performed. The ESP application describes how the site complies with the applicable requirements of 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," 10 CFR Part 52 and the siting criteria of 10 CFR Part 100, "Reactor Site Criteria."⁴

The applicant has not selected a particular reactor design for construction at the PSEG Site. To provide sufficient facility design information for the proposed site, the applicant used the plant parameter envelope (PPE) approach, selecting a set of bounding parameters to represent a surrogate plant, and included these parameters in the ESP application along with the site characteristics that form the basis for an ESP. The PPE approach has been accepted by the NRC in previous ESP applications.

This SER presents the conclusions of the staff's review of information submitted by the applicant to the NRC in support of the ESP application. The staff conducted a four-phase review of the application. The staff identified several open items during the first phase (i.e., Phase A, which included Requests for Additional Information (RAIs) and supplemental RAIs). During the second phase (i.e., Phase B) the staff received and reviewed the applicant's responses to all RAIs and all supplemental RAIs. In consideration of the applicant's responses to the RAIs and the results of the site audits conducted during Phases A and B, the staff issued chapter-specific Advanced Safety Evaluations (ASEs) with no open items at the end of Phase B. The staff presented the ASEs to the NRC Advisory Committee on Reactor Safeguards (ACRS) as part of Phase C of the review. Phase D is the issuance of the final safety evaluation report (FSER). Section 1.6 of this SER, provides a brief summary of the process used to resolve issues that arose during the review; specific details on the resolution for each open item are presented in the corresponding sections of this report.

⁴ The applicant has also submitted information intended to partially address some of the general design criteria (GDC) in Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50. Only GDC 2, "Design Bases for Protection Against Natural Phenomena," applies to an ESP application, and it does so only to the extent necessary to determine the safe-shutdown earthquake (SSE) and the seismically induced flood. The staff has explicitly addressed partial compliance with GDC 2 in this SER, in accordance with 10 CFR 52.17(a)(1) and 10 CFR 50.34(a)(12), only in connection with the applicant's analysis of the SSE and the seismically induced flood.

Appendix A to this SER identifies the proposed permit conditions, site characteristics, bounding design parameters, and inspections, tests, analyses and acceptance criteria (ITAAC) that the staff recommends be imposed, should an ESP be issued to the applicant. Appendix A to this SER also includes certain site related items (COL action items) that will need to be addressed at the COL or construction permit (CP) stage, should the applicant later apply to construct a new nuclear plant on the PSEG Site and references the PSEG Site ESP in its application. The staff concluded that addressing these items is not required for the staff to make its regulatory findings at the ESP stage and that, for reasons specified in Section 1.6, "Summary of Combined License Action Items," of this SER, the COL action items are more appropriately addressed when the applicant has applied for a CP or COL.

Inspections, site visits, and regulatory audits conducted by the staff have verified, where appropriate, the conclusions in this SER. The inspections and audits focused on selected information in the ESP application and its references and are cited and discussed in the applicable sections of this SER.

The ACRS also reviewed the bases for the conclusions in this report, as required by 10 CFR 52.23, "Referral to the ACRS." The ACRS independently reviewed those aspects of the application that concern safety, as well as this SER, and provided the results of its review to the Commission in a June 25, 2015, report. Appendix E to this SER includes a copy of the ACRS report on the FSER.

ABBREVIATIONS

ΔP	pressure drop
$\Delta T/\Delta Z$	temperature change with height
$^{\circ}C$	degree Celsius (Centigrade)
$^{\circ}F$	degree Fahrenheit
$\mu Ci/cc$	microcuries per cubic centimeter
σ_y	lateral plume spread
σ_z	vertical plume spread
χ/Q	atmospheric dispersion factor
1D	one-dimensional
1HD	one-horizontal-dimension
2D	two-dimensional
2HD	two-horizontal-dimension
ABWR	Advanced Boiling-Water Reactor
ac	alternating current
ACI	American Concrete Institute
ACRS	Advisory Committee on Reactor Safeguards
ADAMS	Agencywide Documents Access and Management System
ADCIRC	ADvanced CIRCulation
AFCCC	Air Force Combat Climatology Center
Ag	Silver
AHEX-E	Atlantic Highly Extended crust
ALARA	as low as reasonably achievable
ALI	annual limit on intake
AMC	antecedent moisture condition
ANS	American Nuclear Society
ANSI/ANS	American National Standards Institute/American Nuclear Society
AOO	anticipated operational occurrence
AP1000	Advanced Passive 1000
ASCE	American Society of Civil Engineers
ASE	Advanced Safety Evaluation
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
AST	alternate source term
ASTM	American Society for Testing and Materials
Ba	barium
BBNPP	Bell Bend Nuclear Power Plant
BLEVE	boiling liquid expanding vapor explosion
bpf	blows per foot
BTP	Branch Technical Position
BWR	boiling water reactor
CAA	Clean Air Act
CAV	cumulative absolute velocity
CCDP	conditional core damage probability
CD	compact disc
CDE	committed dose equivalent

CDF	core damage frequency
CEM	Coastal Engineering Manual
CEUS	Central and Eastern United States
CEUS-SSC	Central and Eastern United States Seismic Source Characterization
CFR	Code of Federal Regulations
cfs	cubic feet per second
Ci	curie
CL	clay
CLIMAPS	Climate Maps of the United States
cm	centimeter
CN	curve number
COL	combined operating license
COLA	combined operating license application
COMCOT	Cornell Multi-grid Coupled Tsunami Model
CP	construction permit
cpm	counts per minute
CRM	coastal relief model
CRR	cyclic resistance ratio
CRREL	Cold Regions Research and Engineering Laboratory
CSC	Coastal Services Center
CSR	cyclic stress ratio
CU	consolidated undrained
cu. ft.	cubic feet
cu. m.	cubic meter
CVSZ	Central Virginia Seismic Zone
CWS	circulating water system
D/Q	ground deposition factor
DAC	derived air concentration
DBA	design-basis accident
DBE	design-basis event
DBF	design-basis flood
DBT	dry-bulb temperature
DC	design certification
DCD	design control document
DDA	Delaware Department of Agriculture
DE	Delaware
deg	degrees
DEM	digital elevation model
DEMA	Delaware Emergency Management Agency
DEP	Department of Environmental Protection
DHSS	Department of Health and Social Services
DID	direct inward dial
DNREC	Department of Natural Resources and Environmental Control
DOE	U.S. Department of Energy
DPR	Division of Preparedness and Response
DRBC	Delaware River Basin Commission
EAB	exclusion area boundary
EAL	emergency action level
EAS	emergency alert system

ECFS	East Coast Fault System
ECG	event classification guide
ECL	effluent concentration limit
EERC	Energy and Environmental Resource Center
ELAP	extended loss of A/C power
EMRAD	emergency radio
EMT	emergency medical technician
ENC/JIC	Emergency News Center/Joint Information Center
ENE	east-northeast
ENS	emergency notification system
EOC	emergency operations center
EOF	emergency operations facility
EP	emergency planning
EPA	U.S. Environmental Protection Agency
EPIP	emergency plan implementing procedure
EP-ITAAC	emergency planning - inspections, tests, analyses, and acceptance criteria
EPRI	Electric Power Research Institute
EPZ	emergency planning zone
ER	environmental report
ERDS	emergency response data system
ERO	emergency response organization
ESE	east-southeast
ESP	early site permit
ESPA	early site permit application
ESSX	electronic switch system exchange
ETE	evacuation time estimate
EWD	engineering weather data
FAA	Federal Aviation Administration
FEIS	final environmental impact statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRS	foundation input response spectra
FR	Federal Register
FRMAC	Federal Radiological Monitoring and Assessment Center
FS	factor of safety
FSER	final safety evaluation report
ft	feet/foot
ft/s	feet per second
ft ³	cubic foot
FTS	Federal Telecommunications System
FVCOM	Finite Volume Coastal Ocean Model
g	acceleration due to gravity
gal	gallon
GDC	general design criterion/criteria
GEBCO	General Bathymetric Chart of the Oceans
GET	general employee training
GI-LLI	gastrointestinal tract-lower large intestine
GL	Generic Letter

GMPE	ground motion prediction equation
GMRS	ground motion response spectrum
HAB	hostile action based
HCGS	Hope Creek Generating Station
HEC-HMS	Hydrologic Engineering Center-Hydrologic Modeling System
HEC-RAS	Hydrologic Engineering Center-River Analysis System
HEPA	high-efficiency particulate air
HF	high frequency
Hg	mercury
HHA	hierarchical hazards approach
HMR	hydrometeorological report
HPN	health physics network
hr	hour
Hs	significant wave height
Hz	hertz
IAP	international airport
IDLH	immediately dangerous to life or health
IEEE	Institute of Electrical and Electronics Engineers
in.	inch
INPO	Institute of Nuclear Power Operations
IPCC	Intergovernmental Panel on Climate Change
ISFSI	independent spent fuel storage installation
ISG	Interim Staff Guidance
ITAAC	inspection, test, analysis and acceptance criterion/criteria
ITS	intelligent transportation systems
JFD	joint frequency distribution
kg	kilogram
KI	potassium iodide
km	kilometer
km/hr	kilometers per hour
km ²	square kilometer
km ³	cubic kilometer
kPa	kilopascal
Kr	krypton
kt	knots
L	liter
LAN	local area network
lb	pound
lb/ft ³	pounds per cubic foot
lbf	pound force
LCD	local climatological data
LEL	lower explosive level
LF	low frequency
LLC	limited liability company
LOCA	loss-of-coolant accident
LPZ	low population zone
LWR	light-water reactor
m	meter
m/s	meters per second

m ³	cubic meter
Ma	million years old
mb	millibar
MCL	Management Counterpart Link
MD	Maryland
MEDRB	Maritime Exchange for the Delaware River and Bay
MEI	maximally exposed individual
mg/L	milligrams per liter
mGy	milligray
MHSC	Memorial Hospital of Salem County
mi	mile
mi ²	square mile
mi ³	cubic mile
mm	millimeter
MOST	Method of Splitting Tsunami
mph	miles per hour
mrad	millirad
mrem	millirem
mSv	millisievert
MW	megawatt
M	moment magnitude
MWIS	makeup water intake structure
MXITNS	maximum number of SWAN iterations
N	nitrogen
NAAQS	National Ambient Air Quality Standards
NAVD	North American Vertical Datum
NAVD88	North American Vertical Datum of 1988
NAWAS	National Attack Warning and Alert System
NCDC	National Climatic Data Center
ND	nuclear development
NE	northeast
NED	National Elevation Dataset
NEI	Nuclear Energy Institute
NETS	nuclear emergency telecommunications system
NGDC	National Geophysical Data Center
NID	National Inventory of Dams
NIRMA	Nuclear Information and Records Management Association
NIST	National Institute of Standards and Technology
NJ	New Jersey
NJGS	New Jersey Geological Survey
NJSP	New Jersey State Police
NLDN	National Lightning Detection Network
NM	nautical mile
NNE	north-northeast
NNW	north-northwest
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NOV	Notice of Violation
NPP	nuclear power plant

NQA	nuclear quality assurance
NRC	U.S. Nuclear Regulatory Commission
NRCS	Natural Resources Conservation Service
NRF	National Response Framework
NSIR	Nuclear Security and Incident Response
NSSL	National Severe Storms Laboratory
NTTF	Near-Term Task Force
NUREG	NRC technical report (Nuclear Regulatory Commission)
NW	northwest
NWS	National Weather Service
O3	ozone
OCA	owner controlled area
ODCM	Offsite Dose Calculation Manual
OEM	Office of Emergency Management
ORO	offsite response organization
OSC	operations support center
P	pressure
PA	protected area
PAG	protective action guide
PAR	protective action recommendation
PDF	portable document format
PGA	peak ground acceleration
PM	particulate matter
PMCL	protective measures counterpart link
PMF	probable maximum flood
PMH	probable maximum hurricane
PMP	probable maximum precipitation
PMSS	probable maximum storm surge
PMT	probable maximum tsunami
PMWP	probable maximum winter precipitation
PMWS	probable maximum wind storm
P _o	central pressure
PPE	plant parameter envelope
PRA	probabilistic risk assessment
PRM	Potomac-Raritan-Magothy
psf	pounds per square foot
PSHA	probabilistic seismic hazard analysis
psi	pounds per square inch
psia	pounds per square inch absolute
PSSA	probabilistic storm surge analysis
Pw	peripheral pressure
PWR	pressurized-water reactor
QA	quality assurance
QAP	quality assurance program
QAPD	Quality Assurance Program Description
QAR	quality assurance requirement
QCLCD	quality controlled local climatological data
R	radius of maximum winds
RAI	Request for Additional Information

RCTS	resonant column torsional shear
REAC/TS	Radiation Emergency Assistance Center/Training Site
rem	roentgen equivalent man
REP	radiological emergency preparedness
RERP	radiological emergency response plan
RG	Regulatory Guide
Rh	rhodium
RIS	Regulatory Issue Summary
RLME	repeated large magnitude earthquake
RM	river mile
RMS	radiation monitoring system
RS	Review Standard
RSCL	reactor safety counterpart link
RVT	random vibration theory
S	south
S/HC	Salem and Hope Creek
s/m ³	seconds per cubic meter
SBO	station blackout
SC	sand clay
SE	southeast
sec/m ³	seconds per cubic meter
SEI	Structural Engineering Institute
SER	safety evaluation report
SFP	spent fuel pool
SGS	Salem Generating Station
SLOSH	Sea, Lake, and Overland Surges from Hurricanes
SM	sand silt
SPDS	safety parameter display system
SPM	Shore Propulsion Model
SPT	standard penetration test
SRM	staff requirements memorandum
SRP	Standard Review Plan
SSAR	site safety analysis report
SSC	structures, systems, and components
SSE	safe shutdown earthquake
SSHAC	Senior Seismic Hazard Analysis Committee
SSI	soil structure interaction
SSW	south-southwest
Sv	sievert
SW	southwest
SWAN	Simulating WAVes Nearshore
SWL	still water level
T	forward speed
TAC	technical assessment center
TEDE	total effective dose equivalent
TID	technical information document
TIN	triangular irregular network
TLD	thermoluminescent dosimeter
TR	technical release

TSC	technical support center
TSS	total suspended solids
U.S.	United States
UFSAR	updated final safety analysis report
UHRS	uniform hazard response spectra
UHS	ultimate heat sink
USACE	U.S. Army Corps of Engineers
US-APWR	U.S. Advanced Pressurized-Water Reactor
USCB	U.S. Census Bureau
USCG	U.S. Coast Guard
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USGCRP	U.S. Global Change Research Program
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
W	west
WBT	wet-bulb temperature
WNW	west-northwest
WSEL	water surface elevation level
WSW	west-southwest
Xe	xenon
ybp	years before present
yr	year

1.0 INTRODUCTION AND GENERAL DESCRIPTION

1.1 Introduction

In a May 25, 2010, letter, PSEG Power, LLC and PSEG Nuclear, LLC (PSEG or the applicant) submitted an early site permit (ESP) application (Agencywide Documents Access and Management System (ADAMS) Accession No. ML101480484) for the proposed PSEG Site.

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, New Jersey (NJ). The site is 24.1 kilometers (km) (15 miles (mi)) south of the Delaware Memorial Bridge, 28.97 km (18 mi) south of Wilmington, Delaware (DE), 48.2 km (30 mi) southwest of Philadelphia, Pennsylvania (PA), and 12.1 km (7.5 mi) southwest of Salem, NJ. The other nuclear facilities licensed by the NRC and located adjacent to this site are Salem Generating Station (SGS) Units 1 and 2 and Hope Creek Generating Station (HCGS) Unit 1. The NRC docketed the application on August 4, 2010. Pursuant to 10 CFR Part 52, Subpart A, PSEG requested an ESP with a permit duration of 20 years from the date of issuance.

The staff completed its review of the information presented in the PSEG Site ESP application concerning the site's meteorology, hydrology, geology, and seismology, as well as the potential hazards to a nuclear power plant that could result from manmade facilities and activities on or in the vicinity of the site. The staff also assessed the risks of potential accidents that could occur as a result of the operation of a nuclear plant at the site and evaluated whether the site would support adequate physical security measures for a nuclear power plant. The staff evaluated whether the applicant's quality assurance measures were in accordance with the measures discussed in 10 CFR Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants." The staff reviewed the complete and integrated emergency plans that PSEG would implement if a nuclear plant is eventually constructed at the PSEG Site.

The PSEG Site ESP application includes the site safety analysis report (SSAR), which describes a safety assessment of the site, as required by 10 CFR 52.17, "Contents of Applications." The public may inspect the final revision of the ESP application in ADAMS (Accession Nos. ML15168A201, ML15169A276, ML15169A740, ML12146A110, ML15169A960, ML15169B024). The application is also available for public inspection at the NRC Public Document Room at One White Flint North, 11555 Rockville Pike, Rockville, MD 20852, at the Penns Grove-Carneys Point Public Library, 222 S. Broad Street, Penns Grove, NJ 08069, and at the Salem Free Public Library, 112 W. Broadway, Salem, NJ 08079.

This safety evaluation report (SER)⁵ documents the staff's technical evaluation of the suitability of the proposed PSEG Site for construction and operation of either a single unit or dual unit light water reactor (LWR) nuclear power plant falling within the plant parameter envelope (PPE) that PSEG specified in its application. The applicant did not submit a request for a limited work authorization (LWA) and, therefore, was not required to submit a site redress plan. This SER delineates the scope of the technical matters that the staff considered in evaluating the suitability of the proposed nuclear power plant site. U.S. Nuclear Regulatory Commission

⁵ This SER documents the NRC staff's position on all safety issues associated with the early site permit application. This SER has undergone a final review by the Advisory Committee on Reactor Safeguards (ACRS), and the results of the ACRS review are in a final letter report provided by the ACRS. This report is included as Appendix E to this SER.

(NRC) Review Standard (RS)-002, "Processing Applications for Early Site Permits," Attachment 2, provides guidance for the staff in conducting its review of the radiological safety and emergency planning aspects of a proposed nuclear power plant site. RS-002, Attachment 2, contains regulatory guidance based on NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (hereafter referred to as the SRP). The SRP reflects the staff's many years of experience in establishing and promulgating guidance to enhance the safety of nuclear facilities, as well as in performing safety assessments.

The applicant also filed an environmental report for the PSEG Site in which it evaluated those matters relating to the environmental impact assessment that can be reasonably reviewed at this time. The staff discussed the results of its evaluation of the environmental report for the PSEG Site in a final environmental impact statement (FEIS) (NUREG-2168; ADAMS Accession No. ML15176A444). The applicant did not submit a request for a limited work authorization (LWA) and, therefore, was not required to submit a site redress plan.

Appendix A to this SER contains the list of site characteristics, permit conditions, combined operating license (COL) action items, and the bounding design parameters, and inspections, tests, analyses and acceptance criteria (ITAAC) that the staff recommends the Commission include in any ESP that might be issued for the proposed site. Appendix B to the SER is a chronology of the principal actions and correspondence related to the staff's review of the ESP application for the PSEG Site. Appendix C lists the references for this SER, Appendix D lists the principal contributors to this report, and Appendix E includes a copy of the report by the ACRS.

1.2 General Site Description

The PSEG Site is 24.1 km (15 mi) south of the Delaware Memorial Bridge, 28.97 km (18 mi) south of Wilmington, DE, 48.2 km (30 mi) southwest of Philadelphia, PA, and 12.1 km (7.5 mi) southwest of Salem, NJ. The site location is shown on SSAR Figures 1.2-1 and 1.2-2, which identify major towns, roads, and other prominent features within 9.6 km (6 mi) and 80 km (50 mi), respectively, of the PSEG Site. The existing 2.97 km² (734 acre) PSEG property 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. With the land acquisition agreement, currently under negotiation with the U.S. Army Corps of Engineers (USACE), for an additional 0.34 km² (85 acres) immediately to the north of Hope Creek Generating Station (HCGS), the PSEG Site will be 3.31 km² (819 acres). PSEG stated that in absence of the specifics at the time of the ESP issuance, the agreement in principle with the USACE will serve to establish the basis for eventual land acquisition and Exclusion Area Boundary (EAB) control, necessary to support the issuance of a COL in the future.

Subsequent to the signing of the agreement in principle with the USACE, PSEG will develop a lease agreement for the USACE Confined Disposal Facility (CDF) land to the north of the PSEG Site, depicted on the Site Utilization Plan (SSAR Figure 1.2-3) for the concrete batch plant and temporary construction/laydown use. After the completion of construction, the leased land will be returned to the USACE, subject to any required long-term EAB control conditions.

The nearest population center is the city of Wilmington, DE, with its nearest boundary distance of 23.8 km (14.8 mi) having an estimated population of 72,868 people in 2007. The nearest railroad to the PSEG Site, the Southern Railroad Company of NJ, is located 13.2 km (8.2 mi) to

the northeast at its nearest point. The nearest highway, Delaware Route 9, is 5 km (3.1 mi) to the west, across the Delaware River from the PSEG Site. The nearest accessible highway, New Jersey Route 49, is 12.1 km (7.5 mi) to the northeast of the site. Land access to the site is limited to a road that PSEG constructed to connect its property with an existing secondary road 5.8 km (3.6 mi) to the east of the site. A new site access causeway is proposed by the applicant to support construction and operation of a new nuclear power plant.

Three operating nuclear reactors are located adjacent to the PSEG Site. Salem Generating Station (SGS) Units 1 and 2 are Westinghouse Pressurized Water Reactors (PWRs), rated at 3,459 MWt each. Hope Creek Unit 1, located north of the Salem units, is a General Electric Boiling Water Reactor (BWR), rated at 3,840 MWt. Hope Creek Unit 2 was partially constructed directly adjacent to Hope Creek Unit 1. Surrounding the Salem and Hope Creek units are many support facilities, including circulating and service water intake structures, switchyards, administration buildings, and an independent spent fuel storage installation (ISFSI).

The location selected for a new nuclear power plant on the PSEG Site is to the north of the Salem and Hope Creek operating units, as shown on the applicant's Site Utilization Plan, Figure 1.2-3. The applicant established a site layout for each of four different reactor technology types considered for the PSEG Site (see SSAR Section 1.2.2, "Site Development"). The primary power generation areas (e.g., power block area, switchyard, cooling tower area) are located in the same general area on the PSEG Site for each layout considered, and the bounding footprint for each specific area (e.g., power block area) was developed. The applicant stated that this approach provided a bounding depiction of overall land usage on the PSEG Site. In addition to the land acquired from the USACE, as documented above, PSEG will also obtain the right to temporarily use approximately an additional 0.18 km² (45 acres) of USACE property north of the current PSEG property boundary for temporary construction use.

1.3 Plant Parameter Envelope

The regulations in 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," and 10 CFR Part 100, "Reactor Site Criteria," that apply to an ESP do not require an ESP applicant to provide specific facility design information. However, some facility design information may be required to address 10 CFR 52.17(a)(1), which calls for "an analysis and evaluation of the major structures, systems, and components of the facility that bear significantly on the acceptability of the site under the radiological consequence evaluation factors identified in 52.17(a)(1)(i)(x)(a) and 52.17(a)(1)(i)(x)(b) of this section."

In SSAR Section 1.2.2, "Site Development," the applicant stated that design parameter information from the following reactor designs was used in developing the PSEG Site ESP plant parameter envelope (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)

In SSAR Section 1.3.1, "Plant Parameter Envelope Approach," the applicant stated that the PPE is a set of postulated parameters that bound the parameters of a reactor or reactors that might be deployed at the PSEG Site. This includes site parameters specified by the reactor vendor that must be met by the PSEG Site. The applicant stated that the PPE serves as a surrogate

for actual facility information. The applicant further stated that PPE parameters, along with information established by features of the site itself (i.e., "site characteristics"), support the 10 CFR Part 52.17 analyses required to demonstrate site suitability.

In SSAR Section 1.3.2, "PPE Development Process," the applicant stated that for the PSEG Site ESP application, the PPE was developed by reviewing the information developed by the industry prior to the submittal of the Grand Gulf, Clinton, and North Anna ESP applications, reviewing the correspondence between the NRC and industry on the PPE approach, and reviewing safety evaluation reports, environmental impact statements, and RAIs associated with the first three ESP applications.

In SSAR Section 1.3.3, "PSEG Site Plant Parameter Envelope," Tables 1.3-1 through 1.3-8, the applicant provided a list of postulated design parameters (i.e., PPE), which are developed considering the values provided by the reactor vendors, listed above, to characterize the surrogate facility. The applicant selected the most limiting (maximum or minimum) bounding value. The applicant stated that the site-dependent PPE data was either based on a typical site as provided by the vendors or was modified to take into account site specific conditions, as appropriate. The complete set of plant parameter values characterizes a surrogate plant at the PSEG Site. The applicant stated that SSAR Table 1.3-1 also provides a description or definition for the plant parameters used in evaluating the safety and/or environmental impact of locating the new plant at the PSEG Site.

The staff evaluated the PPE values in the context of applicable SSAR sections of the ESP application. All questions and issues associated with the PPE values that the staff identified during the review as well as their resolution, are discussed in individual sections of this SER.

The applicant provided, through its PPE, sufficient design information to allow it to perform the analysis required by 10 CFR 52.17(a)(1) to determine the adequacy of the proposed exclusion area boundary (EAB) and low population zone (LPZ) for the site. SSAR Chapter 15, "Transient and Accident Analyses" documents the results of this analysis. As stated in SSAR Section 15.1, "Selection of Accidents," the applicant performed the analysis for a broad spectrum of representative postulated design basis accidents (DBAs) to determine the bounding radiological consequences that affect the safe design and siting of an advanced light-water reactor. The applicant selected accidents based on the LWR technologies being considered for development and the regulatory guidance for performing DBA analysis.

In addition to the information supporting the radiological dose consequence evaluation, the applicant provided other design information in its PPE. Since the applicant is not requesting that an ESP be issued referencing a specific reactor design, the staff's review criterion for the PPE is that the PPE values should not be unreasonable for a reactor that might be constructed on the ESP site.

The staff reviewed the applicant's PPE values and finds them reasonable as discussed in individual sections of this SER. As previously noted, the applicant identified certain PPE values as appropriate for inclusion in an ESP, should one be issued. The staff identified certain PPE values as bounding design parameters or controlling PPE values as discussed in the individual sections of this SER. A controlling PPE value, or bounding design parameter value, is one that necessarily depends on a site characteristic. As the PPE is intended to bound multiple reactor designs, the staff would review the actual design selected in a COL or construction permit (CP) application referencing any ESP that might be issued in connection with this application to

ensure that the design fits within the bounding parameter values. Appendix A to this SER lists the bounding design parameters identified for the PSEG ESP Site.

Should an ESP be issued for the PSEG Site, an entity might wish to reference that ESP, as well as a certified design, in a COL or CP application. Such a COL or CP applicant must demonstrate that the site characteristics established in the ESP bound the postulated site parameters established for the chosen design, and that the design characteristics of the chosen design fall within the bounding parameter values specified in the ESP. Otherwise, the COL or CP applicant must demonstrate that the new design, given the site characteristics in the ESP, complies with Commission regulations. Should an entity wish to reference the ESP and a design that is not certified, the COL or CP applicant must demonstrate that the design characteristics of the chosen design, in conjunction with the site characteristics established for the ESP, comply with Commission regulations.

1.4 Identification of Agents and Contractors

In Part 1, “Administrative Information,” of the ESP application, the applicant provided information about the agents and contractors. Section 3.1, “Name of Applicants” of Part 1 identifies PSEG Power, LLC and PSEG Nuclear, LLC as the applicants for the PSEG Site ESP. PSEG Power, LLC submitted the ESP application for itself and PSEG Nuclear, LLC. In Section 3.4, “Descriptions of Organization and Management of Applicants” of Part 1, the applicant stated that PSEG Power, LLC is a Delaware (DE) limited liability company, which is wholly owned by Public Service Enterprise Group Incorporated, a corporation formed under the laws of New Jersey (NJ) with its headquarters and principal place of business being in Newark, NJ. The applicant further stated that PSEG Nuclear, LLC is organized under the laws of DE with its principal place of business being in Hancock’s Bridge, NJ. PSEG Nuclear, LLC is a wholly owned subsidiary of PSEG Power, LLC. The applicant described Public Service Enterprise Group Incorporated as a publicly traded corporation whose shares are widely traded on the New York Stock Exchange. The applicant stated that all of the Directors and principal officers of PSEG Nuclear, LLC, PSEG Power, LLC and Public Service Enterprise Group Incorporated are U.S. citizens. PSEG Nuclear, LLC, PSEG Power, LLC and its parent, Public Service Enterprise Group Incorporated, are not owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government.

As described in Section 1.2 above, there are three existing facilities (HCGS unit 1, and SGS Units 1 and 2) adjacent to the PSEG Site. The applicant also stated in Section 3.4 of Part 1 that of these existing facilities, SGS is 57.41 percent owned by PSEG Nuclear, LLC and 42.59 percent by Exelon Generation LLC, and HCGS is solely owned by PSEG Nuclear, LLC. PSEG Nuclear, LLC is the licensed operator of SGS and HCGS at the PSEG Site, with complete authority to regulate any and all access and activity within the plant exclusion area boundary, and authority to act as the agent of the site owners.

Sargent & Lundy, LLC provided engineering, management, and consulting services to prepare the ESP application. This included project management and engineering services, developing SSAR and environmental report (ER) sections, developing the emergency plan, and preparing the ESP application.

Several subcontractors also assisted in the development of the ESP application. MACTEC Engineering and Consulting, Inc., performed hydrogeological, hydrological and geotechnical field investigations and laboratory testing in support of the ESP application for the PSEG Site.

This testing included performing standard penetration tests for the site, obtaining core samples, and installing groundwater observation wells. In June 2011, AMEC acquired MACTEC Engineering and Consulting, Inc. AMEC Environment and Infrastructure, Inc., provided hydrogeological, hydrological, and geotechnical engineering services in support of the ESP application for the PSEG Site.

William Lettis & Associates, Inc., performed geologic mapping and characterized seismic sources in support of SSAR Section 2.5, "Geology, Seismology, and Geotechnical Information," including literature review, geologic field reconnaissance, review and evaluation of existing seismic source characterization models, identification and characterization of any new or different sources, and preparation of the related SSAR sections. In December 2007, William Lettis & Associates, Inc., was acquired by Fugro Consultants, Inc. William Lettis & Associates operated as a unit of Fugro Consultants until being integrated into Fugro Consultants. Fugro Consultants supported geoscience topics associated with SSAR Section 2.5.

1.5 Summary of Principal Review Matters

This SER documents the staff's technical evaluation of the PSEG Site ESP application. The staff's evaluation included a technical review of the information and data the applicant submitted, with emphasis on the following principal matters:

- population density and land use characteristics of the site environs and the physical characteristics of the site, including meteorology, hydrology, geology, and seismology, to evaluate whether these characteristics were adequately described and appropriately considered in determining whether the site characteristics are in accordance with the Commission's siting criteria (10 CFR Part 100, Subpart B, "Evaluation Factors for Stationary Power Reactor Site Applications on or After January 10, 1997")
- potential hazards of man-made facilities and activities to a nuclear power plant that might be constructed on the ESP site (e.g., mishaps involving storage of hazardous materials (toxic chemicals, explosives), transportation accidents (aircraft, marine traffic, railways, pipelines)), and the existing nuclear power facility comprising the nearby SGS and HCGS operating units
- potential capability of the site to support the construction and operation of a nuclear power plant with design parameters falling within those specified in the application under the requirements of 10 CFR Part 52 and 10 CFR Part 100
- suitability of the site for development of adequate physical security plans and measures for a nuclear power plant
- proposed complete and integrated emergency plan, should an applicant for a CP or COL referencing the PSEG Site ESP decide to seek a license to construct and operate a nuclear power plant on the ESP site; any significant impediments to the development of emergency plans for the PSEG Site; and a description of contacts and arrangements made with Federal, State, and local government agencies with emergency planning responsibilities
- quality assurance measures PSEG applied to the information submitted in support of the ESP application and safety assessment

- the acceptability of the applicant's proposed exclusion area and low-population zone (LPZ) under the dose consequence evaluation factors of 10 CFR 50.34(a)(1)
- the acceptability of the applicant's information related to the Fukushima NTF Recommendations 2.1, and 9.3.

During its review, the staff held several meetings with representatives of PSEG and its contractors and consultants to discuss various technical matters related to the staff's review of the PSEG Site (refer to Appendix B to this SER). The staff also visited the site to evaluate safety matters.

Appendix A to this SER includes a list of the site characteristics, bounding design parameters, permit conditions, COL action items, and ITAAC that the staff recommends be included in an ESP for the PSEG Site. The site characteristics are based on site investigation, exploration, analysis, and testing, performed by the applicant and are specific physical attributes of the site, whether natural or man-made. Bounding design parameters set forth the postulated design parameters that provide design details to support the staff's review. An explanation of COL action items, permit conditions, and ITAAC is provided below in Sections 1.7, 1.8, and 1.9, respectively.

1.6 Summary of Open Items and Confirmatory Items

The staff conducted a 4-phase review of the PSEG Site ESP application. The staff identified several open items during the first phase (i.e., Phase A, which included requests for additional information (RAIs) and supplemental RAIs). For this phase, the staff considered an item as being Open if the applicant had not yet provided the requested information and the staff did not know what would ultimately be included in the applicant's response. During the second phase (i.e., Phase B), the staff received and reviewed the applicant's responses to all RAIs and all supplemental RAIs. In consideration of the applicant's responses to the RAIs and the results of the regulatory audits conducted in Phases A and B, the staff developed Advanced Safety Evaluations (ASEs) with no open items at the end of Phase B. The staff presented the ASEs with no open items to the Advisory Committee on Reactor Safeguards (ACRS) as part of Phase C of the review. Phase D is the issuance of this Final Safety Evaluation Report (FSER).

The staff identified confirmatory items to verify that the applicant incorporated all the necessary changes to which it had committed in RAI responses. An item was identified as confirmatory if the staff and the applicant agreed on a resolution of a particular item, but the resolution had not yet been formally documented in the subsequent revision of the application.

The staff has completed its review of Revision 4 to the PSEG Site ESP application, submitted by the applicant on June 5, 2015, and has verified that the applicant did incorporate those changes in Revision 4. Therefore, the staff considers all confirmatory items closed.

1.7 Summary of Combined License Action Items

The staff also identified certain site-related items that will need to be addressed at the COL or CP stage if a COL or CP applicant desires to construct a new nuclear plant on the PSEG Site and references the PSEG Site ESP. This report refers to these items as COL action items. The COL action items relate to issues that are outside the scope of this SER. The COL action items do not establish requirements; rather, they identify an acceptable set of information to be included in the site-specific portion of the safety analysis report submitted by a COL applicant or

CP applicant referencing the PSEG Site ESP. An applicant for a COL or CP referencing the PSEG Site ESP will need to address each of these items in its application. The applicant may deviate from or omit these items provided that the COL application or CP application identifies and justifies the deviation or omission. The staff determined that the COL action items are not required for the staff to make its regulatory findings on the ESP and for reasons specified in this SER for each item, the COL action items are more appropriately addressed when the applicant has applied for a CP or COL.

The staff identified 36 COL action items. Appendix A to this SER includes the COL action items that a future COL applicant or CP applicant referencing the PSEG Site ESP will need to address. These COL action items are documented in Appendix A to this SER to ensure that particular significant issues are tracked and considered during the COL or CP stage. The COL action items focus on matters that may be significant in any COL application or CP application referencing the ESP for the PSEG Site, if one is issued. Usually, COL action items are not necessary for issues covered by permit conditions or explicitly covered by the bounding parameters. The list of COL action items is not exhaustive with respect to the information required to meet the requirements for a CP or COL.

1.8 Summary of Permit Conditions

The staff identified certain permit conditions that it will recommend be imposed if an ESP is issued to the applicant. The permit conditions are associated with the review of the following areas of the ESP application: “Exclusion Area Authority and Control”; “Evaluation of Potential Accidents – Explosions and Flammable Vapor Clouds”; “Surface Faulting – Geologic Mapping”; “Stability of Subsurface Materials and Foundations – Liquefaction Potential”; and “Emergency Planning.” In total, nine permit conditions are identified.

Appendix A to this SER summarizes these permit conditions. Each permit condition has been assigned a number based on the order in which it appears in this SER. The staff has provided an explanation of each permit condition in the applicable section of this report. These permit conditions, or limitations on the ESP, are based on the provisions of 10 CFR 52.24, “Issuance of Early Site Permit.”

1.9 Summary of Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)

For the reasons explained in this SER, an ESP application proposing complete and integrated emergency plans for review and approval should propose the inspections, tests, and analyses that the holder of a COL referencing the 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, the facility has been constructed and will be operated in conformity with the emergency plans, the provisions of the Atomic Energy Act of 1954, as amended, and Commission rules and regulations.

The staff has identified certain ITAAC that it will recommend be imposed with respect to an ESP issued to the applicant. As part of this SER, the staff reviewed and included ITAAC necessary for PSEG’s Emergency Plans. This report highlights the applicant’s proposed ITAAC and the staff’s review and approval of them. In addition, Appendix A to this SER summarizes the ITAAC approved by the staff.

1.10 Summary of Fukushima Near-Term Task Force (NTTF) Recommendations

After the March 2011 Fukushima Dai-ichi Nuclear Power Plant accident following the Great Tohoku earthquake and subsequent tsunami, the NRC formed a Near-Term Task Force that issued recommendations to reevaluate the safety of nuclear power plant facilities licensed by the NRC and located in the U.S. On March 12, 2012, the NRC issued an information letter⁶ requiring all U.S. operating nuclear power plant licensees to provide further information to support the evaluation of the NRC staff recommendations for the NTTF review of the accident at the Fukushima Dai-ichi nuclear facility. As for the applications under review at the time, the NRC determined that applicants for a COL or an ESP should also provide information with respect to those NTTF recommendations that were applicable for their proposed sites and plants. For the PSEG Site ESP application, only NTTF Recommendation 9.3 (Emergency Preparedness) was determined to be appropriate for the applicant to address.

As for NTTF Recommendation 2.1, the applicant evaluated the seismic and flood hazards using current guidance and methodologies. The staff concluded that the applicant has already addressed the seismic and flood hazard reevaluation portion of Recommendation 2.1. Therefore, there are no additional requirements left to be addressed in Recommendation 2.1 for seismic and flooding reevaluations applicable to the PSEG Site ESP application.

Regarding NTTF Recommendation 9.3, the staff requested that PSEG address staffing and communications provisions to enhance emergency preparedness.

The staff's evaluation of the information submitted by PSEG related to the above mentioned NTTF recommendations (2.1 "Seismic and Flood Hazard Reevaluations" and 9.3 "Emergency Preparedness Regulatory Actions (staffing and communications)") is provided in Chapter 20 of this SER. All other NTTF recommendations will be addressed at the COL application stage and post-licensing stage, as appropriate.

⁶ NRC March 12, 2012, Letter, "Request for information pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) regarding NTTF Recommendations 2.1, 2.3, and 9.3, from the Fukushima Dai-ichi accident." (ADAMS Accession No. ML12053A340)