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10 CFR 50.54(f)

LR-N14-0141

JUN 16 2014

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Salem Generating Station Units 1 and 2
Renewed Facility Operating License Nos. DPR-70 and DPR-75
NRC Docket Nos. 50-272 and 50-311

Subject: Salem Generating Station's Response to March 12, 2012, Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, Enclosure 5, Recommendation 9.3, Emergency Preparedness – Staffing, Requested Information Items 1, 2, and 6 - Phase 2 Staffing Assessment

References:

1. NRC letter, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012
2. PSEG letter LR-N12-0143, "PSEG Nuclear LLC's 60-Day Response to NRC Letter, Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident: dated March 12, 2012," dated May 10, 2012
3. NEI 12-01, "Guideline for Assessing Beyond-Design-Basis Accident Response Staffing and Communications Capabilities," Revision 0, dated May 2012

4. NRC letter to NEI, "U.S. Nuclear Regulatory Commission Review of NEI 12-01, 'Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities,' Revision 0, Dated May 2012," dated May 15, 2012
5. PSEG letter LR-N13-0083, "Salem Generating Station's Response to March 12, 2012, Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, Enclosure 5, Recommendation 9.3, Emergency Preparedness – Staffing, Requested Information Items 1, 2, and 6 - Phase 1 Staffing Assessment," dated April 26, 2013
6. NRC Order Number EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012

Background

On March 12, 2012, the NRC staff issued a request for information pursuant to 10 CFR 50.54(f), regarding the Near-Term Task Force (NTTF) review of insights from the Fukushima Dai-ichi accident (Reference 1). Enclosure 5 of Reference 1 contains the specific Requested Actions, Requested Information, and Required Response associated with Recommendation 9.3 for Emergency Preparedness - Staffing. In accordance with Reference 1, Enclosure 5, PSEG Nuclear LLC (PSEG) submitted a 60-day response letter (Reference 2) to describe its course of action for performing the requested actions and providing the requested information. Consistent with the actions described in Reference 2, the Phase 2 responses to the NTTF Recommendation 9.3: Emergency Preparedness – Staffing, Requested Information Items 1, 2, and 6, are provided herein for SGS Units 1 and 2.

PSEG's staffing assessment follows a two-phased approach for evaluating a beyond-design-basis, large scale external event, consistent with the guidance of NEI 12-01 (Reference 3) as endorsed by the NRC in Reference 4. PSEG provided the results of Phase 1 of the assessment via Reference 5. Phase 1 addresses the staffing levels that are needed to respond to a multi-unit, beyond-design-basis external event (BDBEE) that results in an extended loss of alternating current (AC) power and impeded access to the site, not including the staffing needed to implement actions that address NRC Order EA-12-049 (Reference 6). The Phase 2 assessment provided herein addresses staffing to implement diverse and flexible coping strategies (FLEX) in response to NRC Order EA-12-049.

Enclosure 1 to this letter provides the Phase 2 staffing assessment report for SGS Units 1 and 2. In accordance with Reference 2, Enclosure 1, this letter provides the response to the following information requests:

- Reference 1, Enclosure 5, Staffing, Requested Information Item 1
- Reference 1, Enclosure 5, Staffing, Requested Information Item 2
- Reference 1, Enclosure 5, Staffing, Requested Information Item 6

Requested Information Item 1

It is requested that addressees provide an assessment of the onsite and augmented staff needed to respond to a large scale natural event meeting the conditions described in the Discussion section (Reference 1, Enclosure 5). This assessment should include a discussion of the onsite and augmented staff available to implement the strategies as discussed in the emergency plan and/or described in plant operating procedures. The following functions are requested to be assessed:

- *How onsite staff will move back-up equipment (e.g., pumps, generators) from alternate onsite storage facilities to repair locations at each reactor as described in the Order regarding the NRC Near-Term Task Force (NTTF) Recommendation 4.2. It is requested that consideration be given to the major functional areas of NUREG-0654, Table B-1, such as plant operations and assessment of operational aspects, emergency direction and control, notification/communication, radiological accident assessment, and support of operational accident assessment, as appropriate.*
- *New staff or functions identified as a result of the assessment.*
- *Collateral duties (personnel not being prevented from timely performance of their assigned functions).*

Response to Requested Information Item 1

Enclosure 1 provides the requested Phase 2 staffing assessment. Response to the specific items included in Requested Information Item 1 is as follows

- The Phase 2 assessment concludes that the minimum complement of on-shift staff allowed by the current PSEG Emergency Plan, combined with two additional on-shift personnel to support site-wide (i.e., Hope Creek and SGS) equipment hauling and debris removal, are capable of responding to the Phase 2 scenario. This assessment considers the major functional areas associated with on-site implementation of the FLEX strategies, including the relocation of equipment from storage areas to deployment locations. The staffing assessment also addresses the ability of the on-shift staff to perform any required emergency

response functions prior to the delayed arrival of the augmented Emergency Response Organization (ERO).

- Based on the results of this assessment, PSEG will establish administrative controls to ensure the availability of the two on-shift individuals assigned to the functions of site-wide equipment hauling and debris removal in support of FLEX strategy implementation.
- The staffing assessment determined that personnel were not prevented from timely performance of their functions due to collateral duties. There are no conflicts or overlaps in functions or tasks required to be performed by on-shift operations and support personnel.

Requested Information Item 2

Provide an implementation schedule of the time needed to conduct the onsite and augmented staffing assessment. If any modifications are determined to be appropriate, please include in the schedule the time to implement the changes.

Response to Requested Information Item 2

PSEG has initiated the changes to administrative controls for shift staffing to ensure the availability of personnel to support equipment hauling and debris removal. These changes are tracked in PSEG's corrective action program and are planned to be completed on a schedule consistent with FLEX strategy implementation prior to restart from the Salem Unit 1 23rd refueling outage in the Fall of 2014.

Requested Information Item 6

Identify changes that have been made or will be made to your emergency plan regarding the on-shift or augmented staffing changes necessary to respond to a loss of all ac power, multiunit event, including any new or revised agreements with offsite resource providers (e.g., staffing, equipment, transportation, etc.).

Response to Requested Information Item 6

The Phase 2 staffing assessment provided in Enclosure 1 did not identify any changes to the Emergency Plan requirements for on-shift staffing, augmented staffing, or agreements with offsite resource providers.

There are no regulatory commitments contained in this letter.

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10 CFR 50.54(f)

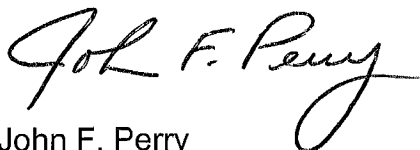
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If you have any questions or require additional information, please do not hesitate to contact Mr. Lee Marabella at 856-339-1208.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 6/16/14
(Date)

Sincerely,



John F. Perry
Site Vice President
Salem Generating Station

Enclosure 1: Salem Generating Station – Fukushima Response NEI 12-01 Phase 2
Staffing Assessment Report

cc: Mr. E. Leeds, Director of Office of Nuclear Reactor Regulation
Mr. W. Dean, Administrator, Region I, NRC
Mr. J. Lamb, Project Manager, NRC
NRC Senior Resident Inspector, Salem
Mr. P. Mulligan, Manager IV, NJBNE
Salem Commitment Tracking Coordinator
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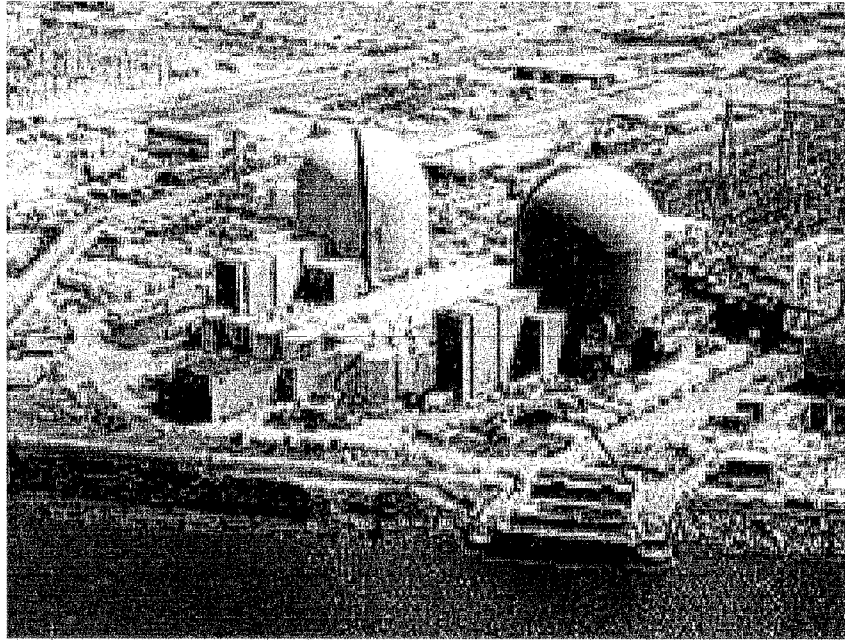
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Enclosure 1

Salem Generating Station – Fukushima Response

NEI 12-01 Phase 2 Staffing Assessment Report

SALEM GENERATING STATION



FUKUSHIMA RESPONSE

NEI 12-01 PHASE 2

STAFFING ASSESSMENT REPORT

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1. Executive Summary

PSEG Nuclear LLC (PSEG) conducted an assessment of the capability of the on-shift organization as defined by the Emergency Plan, Fire Protection staffing procedures, and Operations shift staffing procedures to implement mitigation strategies in response to a beyond-design-basis extended loss of AC power (ELAP) event, based on lessons learned from the Fukushima Dai-ichi accident. The on-shift staffing analysis was facilitated by EP Consulting, LLC and was conducted in accordance with the guidance in NEI 12-01, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities." This report describes the methods and results of the staffing assessment for Salem Generating Station (SGS) Units 1 and 2. It takes into account actions that would be taken by Hope Creek Generating Station (HCGS) and actions of shared site resources such as the Fire Brigade and personnel for equipment hauling and debris removal.

This assessment concluded that sufficient on-shift resources are available at all times to implement the strategies developed to maintain or restore core cooling, containment and spent fuel pool cooling during a beyond-design-basis external event (BDBEE) that results in an ELAP affecting all on-site units simultaneously. The personnel that are assumed to be on-site during the BDBEE are part of the minimum complement allowed by the PSEG Emergency Plan, except for two personnel resources that are assumed to be available on site for equipment hauling and debris removal. These two personnel resources are part of the 12-hour shift providing continuous on-site coverage and will be subject to administrative controls for shift staffing to support the SGS and HCGS BDBEE mitigation strategies.

2. Introduction

This report documents the analysis performed to meet the commitments for conducting a staffing assessment for a BDBEE at a multi-unit site affecting all units. This report is in response to the Nuclear Regulatory Commission's (NRC's) March 12, 2012, request for information pursuant to 10 CFR 50.54(f) regarding the Near-Term Task Force (NTTF) review of insights from the Fukushima Dai-ichi accident (Reference 1). The assessment uses NEI 12-01, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communication Capabilities," (Reference 2) and NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," (Reference 3) to determine the response of on-shift and augmented resources to an ELAP incident impacting all units at a site. The assessment addresses Phase 2 of the analysis applicable to implementation of existing and FLEX strategies for an ELAP, which is applicable to all units at a multi-unit site during the initial and transition phases of the event, utilizing the methodology of NEI 10-05, "Assessment of On-Shift Emergency Response Organization Staffing and Capabilities" (Reference 4). The assessment was performed to support the SGS response.

The assessment was conducted using draft FLEX Support Guidelines (FSGs) in place as of February 27, 2014 and draft revisions to Operations procedures. The assessment

considers required actions performed during the initial and transition phases of an ELAP (first 24 hours). Consistent with NEI 12-01 and NEI 12-06, near-normal site access and the ability to receive and deploy offsite resources are considered to be established during the final phase (24+ hours following the ELAP).

3. Staffing Assessment Process Overview

Draft strategies including FSGs for responding to an ELAP affecting all on-site units (SGS Units 1 and 2, and HCGS) were evaluated during the NEI 12-01 Phase 2 staffing analysis by a multi-discipline team. The staffing analysis also addressed the ability of the on-shift staff to perform any required emergency response functions prior to the delayed arrival of the augmented Emergency Response Organization (ERO).

The Phase 2 staffing assessment requires that the ELAP scenario be evaluated using the minimum staffing in the PSEG Emergency Plan (consistent with NEI 12-01) along with the supplemental staff allowed by minimum administrative staffing procedures (consistent with NEI 12-06). Table 3-1 identifies the personnel that were used to implement the strategies considered in this staffing assessment.

Salem Generating Station
 NEI 12-01 Phase 2 Staffing Assessment Report

Table 3-1 PSEG Nuclear LLC Emergency Plan, Rev 28 On-Shift Staffing Emergency Response Organization		Supplemental Administrative Staff (NEI 12-06)
Position	On-shift	On-Shift
Shift Manager (SM)	1	
Control Room Supervisor (SRO) ¹	2	
Field Supervisor/Initial Operations Support Center (OSC) Coordinator	1	
Shift Technical Advisor (STA)	1	
Reactor Operator (RO)	2	
Plant Operator (RO)	2	
Control Room Communicator ²	2	
Equipment Operator (EO)	5	
Radwaste Operator ³ (EO)	1	
Radiation Protection (RP) Technician ⁴	4	
Chemistry Technician ⁵	2	
Shift Maintenance Supervisor	1	
Scheduled I&C Technician ⁸	2	
Shift Electrician ⁸	2	
Total:	28	
Fire Department ⁶	5	
Rescue Operations/First Aid ⁷	2	
Security	Sec plan	
MM resources ⁹		2

- ¹ One Unit Supervisor assigned to each unit.
- ² Two Control Room Communicators for offsite notifications which typically includes one additional RO and one additional Equipment Operator.
- ³ This position is staffed by a dedicated Equipment Operator.
- ⁴ Two RP Technicians on shift per station. This assessment assumes the two SGS technicians are available, and did not use Hope Creek (HCGS) technicians to support SGS.
- ⁵ One Chemistry Technician per station, for a total of two, provides chemistry sampling support. This assessment assumes the SGS technician is available, and did not use the HCGS technician to support SGS.
- ⁶ Fire Department is a separate department serving the entire site. The Fire Brigade for each shift consists of one Fire Department Leader and five Fire Department Members.
- ⁷ Rescue Operations/First Aid are a collateral duty of the Fire Department.
- ⁸ One Instrumentation and Control (I&C) Technician and one Shift Electrician per station. This assessment assumes the SGS I&C Technician and Shift Electrician are available, and did not use HCGS personnel to support SGS.
- ⁹ Maintenance Mechanic (MM) refers to resources capable of performing debris removal and heavy equipment towing (see Appendix 1)

4. NEI 12-01 Phase 2 Assessment Results

The minimum on-shift staff as shown in Table 3-1 performed all actions required by operating and emergency plan procedures in the first one-hour period, relying only on installed structures, systems and components remaining in the initial phase of the response. PSEG determined that the draft FSGs were capable of being successfully implemented via table top exercise, using on-shift resources during the first six (6) hours and augmented responders from six (6) to twenty-four (24) hours.

No conflicts or overlaps in functions or tasks required to be performed by on-shift operations and support personnel were identified during this analysis. Transition phase actions were required within the first six hours of the event.

Resources that may be shared between SGS and Hope Creek (HCGS) such as RP Technicians and Chemistry Technicians were not used for the SGS analysis, with the exception of supplemental maintenance mechanics (MMs). One MM from each site was used. A parallel assessment for HCGS was conducted to ensure there was no conflict over resources shared with SGS.

An evaluation of each FSG was conducted in order to determine the resources needed and estimated duration of each task associated with the strategy. The total number of resources identified and task duration were then used to identify the two most resource limiting FLEX strategies. This analysis identified that the two most resource limiting FLEX strategies are:

- Restoration of 125 vdc Battery Chargers (FSG-5, Attachment 1)
- Ultimate Heat Sink (UHS) pump hookup and Service Water (SW) pressurization (FSG-5, Attachment 3).

5. NEI 12-01 Phase 2 Actions

During the tabletop procedural analysis, the following actions to support the conclusions of this staffing assessment were identified:

1. Revise Attachment 18 of OP-SA-112-101-1001, "Shift Turnover Responsibilities (Reference 6) and Attachment 5 of OP-HC-112-101-1001, "Shift Turnover Responsibilities" (Reference 7), to reflect the addition of one Maintenance Mechanic resource for each station.
2. Review final FSGs and associated station procedure revisions against this staffing assessment and reconcile any significant differences (i.e., changes affecting staffing resource needs).

6. Staffing Assessment Details

The Phase 2 Staffing Analysis for SGS was conducted on February 25, 2014, using the guidance of NEI 12-01, NEI 12-06 and NEI 10-05.

Table 6-1 identifies the personnel who participated in the assessment.

**Table 6-1
 Phase 2 Assessment Participants**

Personnel (Position/Title)	Number	Organization/Department
Senior Reactor Operator (SRO)	2	Fukushima Team (formerly licensed at SGS)
Nuclear Control Operator (RO)	1	Fukushima Team (formerly licensed at SGS)
Nuclear Equipment Operator (NEO)	1	Operations
Radiation Protection Technician	1	RP
Chemistry Superintendent	1	Chemistry
EP Manager	1	EP
Fire Department Supervisor	1	Site Protection
Maintenance Supervisor	1	Maintenance
EP Specialist	2	EP Consulting, LLC

6.1 Assumptions

The extended loss of AC power event was evaluated using the following assumptions, consistent with NEI 12-01, NEI 12-06, and applicable assumptions from NEI 10-05.

6.1.1 NEI 12-01 – Assumptions for Staffing Assessment

1. A large-scale external event occurs that results in:
 - all on-site units affected
 - extended loss of AC power
 - impeded access to the units
2. Initially, all on-site reactors are operating at full power and are successfully shut down.
3. No Hostile Action is directed at the affected site during the period that the site is responding to the event.
4. The event impedes site access as follows:
 - A. Post-event time: 6 hours – No site access. This duration reflects the time necessary to clear roadway obstructions, use different travel routes, mobilize alternate transportation capabilities (e.g., private resource providers or public sector support), etc.
 - B. Post-event time: 6 to 24 hours – Limited site access. Individuals may access the site by walking, personal vehicle or via alternate transportation capabilities (e.g., private resource providers or public sector support).
 - C. Post-event time: 24+ hours – Improved site access. Site access is restored to a near-normal status and/or augmented transportation resources are available to deliver equipment, supplies and large numbers of personnel.
5. On-shift personnel are limited to the minimum complement allowed by the Emergency Plan (i.e., the minimum required number for each required position), supplemented with additional on-shift staff consistent with NEI 12-06 (Assumption #12 in Subsection 6.1.3, below).
6. Following the accident at Fukushima Dai-ichi, the Institute of Nuclear Power Operations (INPO) issued three Industry Event Reports (IERs) requiring the assessment and implementation of a range of actions intended to improve the capabilities for responding to a BDBEE and ELAP, including events that impact the cooling of spent fuel. The Phase 2 staffing assessment includes the INPO IER improvement actions already implemented at the time of the assessment.

6.1.2 NEI 10-05 - Applicable Assumptions

1. On-shift personnel can report to their assigned response locations within timeframes sufficient to allow for performance of assigned actions.
2. The on-shift staff possesses the necessary Radiation Worker qualifications to obtain normal dosimetry and to enter Radiologically Controlled Areas (but not high, locked high or very high radiation areas) without the aid of a Radiation Protection Technician.
3. Personnel assigned to the major response area of plant operations and safe shutdown meet the requirements and guidance established by NRC regulations and are able to satisfactorily perform the functions and tasks necessary to achieve and maintain safe shutdown. Staff performance within this area is not evaluated as part of this assessment, unless a role/function/task from another major response area is assigned as a collateral duty.
4. On-site security organization: Performance of this function is regularly analyzed through other station programs and will not be evaluated here, unless a role or function from another major response area is assigned as a collateral duty.
5. Individuals holding the position of Radiation Protection Technician or Chemistry Technician are qualified to perform the range of tasks expected of their position.
6. The task of making a simple and brief communication has minimal impact on the ability to perform other assigned functions/tasks, and is therefore an acceptable collateral duty for all positions. This assumption does not apply to emergency notification to an Offsite Response Organization (ORO) or the NRC.
7. The task of performing a peer check has minimal impact on the ability to perform other assigned functions/tasks, and is therefore an acceptable collateral duty for all positions.
8. The analyzed events occur during off-normal work hours at a time when augmented ERO responders are not at the site (e.g., during a backshift, weekend or holiday). For purposes of this analysis, and consistent with NEI 12-01 Assumption #4, 360 minutes (6 hours) will be used as the time period for the conduct of on-shift ERO response actions.

6.1.3 NEI 12-06 Assumptions

1. Prior to the event both units have been operating at 100 percent rated thermal power for at least 100 days or have just been shut down from such a power history as required by plant procedures in advance of the impending event.

2. At the time of the postulated event, both units' reactors and supporting systems are within normal operating ranges for pressure, temperature, and water level for the appropriate plant condition. All plant equipment is either normally operating or available from the standby state as described in the plant design and licensing basis.
3. No specific initiating event is used. The initial condition is assumed to be a loss of off-site power (LOOP) at a plant site resulting from an external event that affects the off-site power system either throughout the grid or at the plant with no prospect for recovery of off-site power for an extended period. The LOOP is assumed to affect all units at a plant site.
4. All installed sources of emergency on-site ac power and SBO Alternate ac power sources are assumed to be not available and not imminently recoverable.
5. Cooling and makeup water inventories contained in systems or structures with designs that are robust with respect to seismic events, floods, and high winds, and associated missiles are available.
6. Normal access to the ultimate heat sink is lost, but the water inventory in the UHS remains available and robust piping connecting the UHS to plant systems remains intact. The motive force for UHS flow, i.e., pumps, is assumed to be lost with no prospect for recovery.
7. Fuel for FLEX equipment stored in structures with designs which are robust with respect to seismic events, floods and high winds and associated missiles, remains available.
8. Permanent plant equipment that is contained in structures with designs that are robust with respect to seismic events, floods, and high winds, and associated missiles, are available.
9. Other equipment, such as portable ac power sources, portable back up dc power supplies, spare batteries, and equipment for 50.54(hh)(2), may be used provided it is reasonably protected from the applicable external hazards per Sections 5 through 9 and Section 11.3 of this guidance and has predetermined hookup strategies with appropriate procedures/guidance and the equipment is stored in a relative close vicinity of the site
10. Installed electrical distribution system, including inverters and battery chargers, remain available provided they are protected consistent with current station design.
11. No additional events or failures are assumed to occur immediately prior to or during the event, including security events.
12. On-site staff is at administrative minimum shift staffing levels per Section 2 of the NEI 12-06 guidance. All personnel on-site are available to support site response.

13. Reliance on the fire protection system ring header as a water source is acceptable only if the header meets the criteria to be considered robust with respect to seismic events, floods, and high winds, and associated missiles.

6.1.4 Plant Specific Assumptions

1. Spent Fuel Pool Time-to-Boil is 43 hours from the time of the loss of Fuel Pool Cooling based on 100 days of operations since refueling outage with a heat up rate of 2.1 °F/hour (reference S1(2).OP-AB.SF-001).
2. The AFW Storage Tank has a 12 hour capacity as the turbine-driven auxiliary feedwater (TD AFW) pump source during seismic events.
3. The AFW Storage Tank is unavailable as the TD AFW pump source during hurricane (high wind) and tornado events.
4. The 28 vdc batteries have greater than 6 hours of capacity with implementation of deep load shed.
5. The 125 vdc batteries have greater than 6 hours of capacity with implementation of deep load shed.
6. NEOs have access to vital area door keys to allow access to areas/rooms without security support.
7. Two FLEX diesel generators are staged in the area between the Unit 2 auxiliary and fuel handling buildings (“canyon area”) and are reasonably protected from external events. The canyon area is provided with temporary flood protection.

6.2 Methodology

An assessment of on-shift staffing was performed using NEI 12-01, NEI 12-06 and NEI 10-05. Subject matter experts and consultants were assembled to provide analysis support. The assessment was conducted via a tabletop procedural analysis using SGS procedures to determine if tasks have been sufficiently analyzed for performance by the minimum on-shift staff as designated in the Emergency Plan and supplemental administrative staff. The following provides a summary of the process that was used.

The existing on-shift staff structure and size is defined by Figure 3-1 of the PSEG Emergency Plan (Reference 5) and References 6 through 9.

Each on-shift position used in this staffing analysis was entered in Appendix 1, Table 1. For position titles with more than one position holder, a unique sequential number was assigned to each position. The PSEG Emergency Plan reference that describes the requirement for the position to be on-shift was then entered into column 3 of Appendix 1, Table 1.

Using only the on-shift positions entered in Appendix 1, Table 1, the following Appendix 1 tables were completed by entering the shift position that fills a described role, or performs a specific function or task:

- Table 2, “Plant Operations & Safe Shutdown” (Minimum Operations Crew Necessary to Implement AOPs and EOPs, FSGs or SAMGs if applicable)
- Table 2A, “Procedure Task Timing (Hurricane Response)”
- Table 2B, “Procedure Task Timing (Tornado Response)”
- Table 3, “Firefighting” (not applicable for this event analysis)
- Table 4, “Radiation Protection & Chemistry”
- Table 5, “Emergency Plan Implementation”

Following completion of each of the above tables, each on-shift position assigned to the associated table was located on Appendix 1, Table 1. For each position, the table number and associated line number was then entered in column 4, “Role in Table#/Line#”. If the associated task required additional actions, a “Yes” was placed in the last column and the additional action was included in Section 5 of this report, i.e., establish administrative controls to ensure the availability of personnel to perform debris removal and equipment hauling.

The assessment was conducted using the following process:

1. Selection of the multi-disciplined work group
2. Scheduling the tabletop with access to required procedures and administrative documents
3. Conduct of a pre-job briefing outlining the requirements of NEI 12-01, NEI 12-06 and NEI 10-05
4. Review of the event initial conditions and assumptions
5. Performance of the tabletop procedural analysis
6. Documentation of the results of the tabletop by EP Consulting using the NEI 10-05 forms modified to extend to 24 hours.

This review provided the team with a basic understanding of the event and resulting emergency classifications. The SRO reviewed EOP, AOP and FSG actions and identified them to the team. Specific site procedures referenced during assessment of this postulated event are provided in Tables 2A and 2B. Specific resources needed to perform initial event response actions were identified from the EOP, AOP, or FSG procedures and documented. The team determined when other on-shift resources, such as the RP or Chemistry Technician, would be required and identified the time required to perform expected emergency plan functions. This information was documented on the applicable tables in Appendix 1 of this report. Finally, the on-shift resources and their actions were summarized in the tables using the NEI 10-05 documentation process in Appendix 1, Table 1.

6.3 Security Considerations

Mitigation strategies for a BDBEE do not require the use of Security Department personnel to perform duties unrelated to their security roles, e.g., the SGS mitigation strategies do not rely on Security Officers to perform any collateral duties such as equipment hauling or debris removal.

7. Strategy Resource Loading

An evaluation of each FSG was conducted to determine the resources needed and estimated duration of each task associated with the strategy. This evaluation is not associated with any specific event. Resource loading analyses are contained in Table 7-1.

**Table 7-1
 FLEX Support Guideline (FSG) Resource Requirements**

FSG	Description	Resources	Duration	Notes
FSG-1	RCS Long Term RCS Inventory Control (Service Water to 13 Charging Pump)	EO (4) RO (2)	2 hours	Contingency Action
FSG-2	Alternate Aux Feedwater Suction Source (align to HCGS FP Tank)	EO (2) SP (2)	55 minutes	Time sensitive - S/G Inventory
FSG-3	Alternate Low Pressure Feedwater	EO (4)	2 hours	Time sensitive - S/G Inventory
FSG-4	ELAP DC Bus Load Shed/Management	EO (2)	1.5 hours	Time sensitive – extend battery capacity
FSG-5	Initial Assessment and Flex Equipment Staging			
	Vent generator H ₂ (both units)	SP (1)	1 hour	Task completed in series by one person
Att 1, Part 1	Restore 125 vdc Battery Chargers	EO (2) EM (1)	5 hours	Time sensitive – battery charger restoration
Att 1, Part 2	Restore 230 vac MCCs	EO (2)	2 hours	N/A
Att 2	Debris Removal and Equipment Transport for Salem	MM (2)	3.5 hours	Performed in conjunction with HCGS debris removal and deployment (HCGS – 2.5 hours)

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 NEI 12-01 Phase 2 Staffing Assessment Report

FSG	Description	Resources	Duration	Notes
Att 2	Energize Flex 480 vac bus	EO (2)	2 hours	Time sensitive – bus restoration
Att 2	Energize the A 460/230 bus.	EO (2)	1 hour	Time sensitive – bus restoration
Att 3	Debris removal and pump deployment (UHS)	MM (2)	4 hours	Time sensitive – S/G Inventory
Att 3	UHS pump hookup and SW header pressurized	Sec (1) EO (2) MM(2)	5 hours	Time sensitive – S/G Inventory (augmented resources used)
Att 7	Feed Steam Generators	EO (2)	continuous	Time sensitive – S/G Inventory
FSG-6	Alternate Aux Feedwater Storage Tank Makeup	N/A	N/A	Not required during initial or transition phase
FSG-7	Loss of Vital Instrumentation or Control Power			
Att 1	Addressed by FSG 5	N/A	N/A	N/A
Att 2	Manual Steam Generator Pressure Control	EO (4)	30 minutes	Contingency Action
Att 3	Steam Generator Pressure	EO (4)	1 hour	Contingency Action
Att 4	RCS Pressure Indication	IC (1)	1 hour	Contingency Action
Att 5	Alternate CETs	IC (1)	2 hours	Contingency Action
Att 6	Containment Pressure Indication	IC (1)	1 hour	Contingency Action
Att 7	Aux Feedwater Storage Tank Level Indication	EO (1)	30 minutes	Contingency Action
Att 8	Pressurizer Level Indication	IC (1)	1 hour	Contingency Action
Att 9	Refueling Water Storage Tank Level Indication	EO (1)	1 hour	Contingency Action
FSG-8	Alternate RCS Boration (Flex Charging pump from Boric Acid Storage Tank)	EO (4)	2 hours	Contingency Action
FSG-9	Low Decay Heat Temperature Control	EO (2) RO (2)	30 minutes	Contingency Action
FSG-10	Passive RCS Injection Isolation	RO (2)	1 hour	N/A
FSG-11	Alternate Spent Fuel Pool Makeup and Cooling (Makeup from Fresh/Fire Protection)	EO (2)	3 hours	Not required during initial or transition phase

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FSG	Description	Resources	Duration	Notes
FSG-12	Alternate Containment Cooling	N/A	N/A	Not required during initial or transition phase
FSG-13	Transition from FLEX Equipment	N/A	N/A	Not required during initial or transition phase

 Time Sensitive Task

8. Conclusions

The existing on-shift staff structure and size is described in the documents referenced in Section 6.2 of this report. Collectively these documents describe a staff structure and size that is sufficient to carry out the FSG actions for the most limiting BDBEE situations.

One resource (currently designated as MM in the Appendix 1 tables) is being added to References 6 and 7 for Salem and Hope Creek, respectively. For the purposes of this analysis the team assumed that one resource capable of performing debris removal and equipment towing assigned to Salem and one assigned to Hope Creek would be available as anticipated by FSG-5. However, any qualified personnel who are not already assigned to minimum shift staffing / emergency response / Fire Brigade roles may be so assigned.

9. References

1. NRC letter, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," March 12, 2012
2. NEI 12-01, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities," Revision 0, May 2012
3. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, August 2012
4. NEI 10-5, "Assessment of On-Shift Emergency Response Organization Staffing and Capabilities," Revision 0, June 2011
5. PSEG Nuclear LLC Emergency Plan Revision 28
6. OP-SA-112-101-1001 Revision 3, "Shift Turnover Responsibilities" (Attachment 18)
7. OP-HC-112-101-1001 Revision 18, "Shift Turnover Responsibilities " (Attachment 5)
8. FP-AA-012 Revision 2, "Fire Protection Organization, Duties and Staffing"
9. OP-AA-101-111 Revision 4, "Roles and Responsibilities of On-Shift Personnel"

10. Table of Acronyms

Acronym	Definition
AC	Alternating Current
AFW	Auxiliary Feed Water
AOP	Abnormal Operating Procedure
BDBEE	Beyond-Design-Basis External Event
B/O	Blackout
BOP	Balance of Plant
CFST	Critical Function Status Tree
CT	Chemistry Technician
DC	Direct Current
DG	Diesel Generator
ELAP	Extended Loss of AC Power
EM	Electrical Maintenance
EO	Equipment Operator
EOP	Emergency Operating Procedure
EP	Emergency Plan
ERO	Emergency Response Organization (on shift and supplemental)
FB	Fire Brigade
FLEX	Diverse and Flexible Coping Strategies
FP	Fire Protection
FSG	FLEX Support Guideline
H2	Hydrogen
HCGS	Hope Creek Generating Station
I&C	Instrumentation and Control
IER	Industry Event Report

Acronym	Definition
INPO	Institute of Nuclear Power Operations
LOOP	Loss of Off-site Power
MCC	Motor Control Center
MDAFP	Motor-driven Auxiliary Feedwater Pump
MM	Maintenance Mechanic
NEI	Nuclear Energy Institute
NEO	Nuclear Equipment Operator
NRC	Nuclear Regulatory Commission
OATC	Operator at the Controls
ORO	Offsite Response Organization
OSA	On-Shift Staffing Analysis
OSC	Operations Support Center
PO	Plant Operator
PSEG	Public Service Enterprise Group LLC
RCS	Reactor Coolant System
RO	Reactor Operator
RP	Radiation Protection
SAMG	Severe Accident Management Guideline
SBO	Station Blackout
SAS/CAS	Secondary Alarm Station/Central Alarm Station
SEC1	Security – SAS/CAS Operator
SEC	Safeguards Equipment Controller
SGS	Salem Generating Station
SM	Shift Manager
SMS	Shift Maintenance Supervisor
SP	Site Protection

Acronym	Definition
SRO	Senior Reactor Operator
STA	Shift Technical Advisor
SW	Service Water
TD	Turbine-driven
TSC	Technical Support Center
U1	Unit 1
U2	Unit 2
UHS	Ultimate Heat Sink

**Salem Generating Station
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Appendix 1 - Staffing Tables

**Salem Generating Station
Operations On-Shift Personnel Assignments Used During Analysis**

Position	Designation	Assignment
Shift Manager	SM	Shift Manager/Emergency Director
Control Room Supervisor	SRO1	Unit 1 Control Room Supervisor
Control Room Supervisor	SRO2	Unit 2 Control Room Supervisor
Field Supervisor	SRO3	Field Supervisor/Initial OSC Coordinator
Shift Technical Advisor	STA	Shift Technical Advisor
Reactor Operator	RO1	Unit 1 Operator At Controls (OATC)
Plant Operator	PO1	Unit 1 Balance of Plant (BOP)
Reactor Operator	RO2	Unit 2 Operator At The Controls (OATC)
Plant Operator	PO2	Unit 2 Balance of Plant (BOP)
CR Communicator	CM1	Offsite Communications
CR Communicator	CM2	Offsite Communications
Equipment Operator	EO1	Unit 1 Aux Building EO
Equipment Operator	EO2	Unit 2 Aux Building EO
Equipment Operator	EO3	Unit 1 Turbine Building EO
Equipment Operator	EO4	Unit 2 Turbine Building EO
Equipment Operator	EO5	Outside EO
Equipment Operator	EO6	Radwaste Operator

Other On-Shift Personnel Assignments Used During Analysis

Position	Designation	Assignment
RP Technician	RP1	Offsite Dose Assessment (SRPT)
RP Technician	RP2	RP Support (ORPT)
Chemistry Technician	CT1	Chemistry Sampling/Count Room
Shift Maintenance Supervisor	SMS	OSC Coordinator
Scheduled I&C Technician	IC1	I&C Maintenance Support
Shift Electrician	EM1	Electrical Maintenance Support
Site Protection	SP1	Fire Department Chief
Site Protection	SP2	Fire Department Responder
Site Protection	SP3	Fire Department Responder
Site Protection	SP4	Fire Department Responder
Site Protection	SP5	Fire Department Responder
SAS/CAS Operator	SEC1	Accountability
Maintenance	MM1	Maintenance
Maintenance	MM2	Maintenance

APPENDIX 1
Loss of all AC Power

TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Role in Table#/Line#	Action Required?
1.	Shift Manager/SM	PSEG Nuclear LLC – EP, Figure 3-1	T2/L1 T5/L1 T5/L2 T5/L3 T5/L5 T5/L6 T5/L7 T5/L9 T5/L13	No
2.	Control Room Supervisor – U1 (SRO1)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L2	No
3.	Control Room Supervisor - U2 (SRO2)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L3	No
4.	Reactor Operator – U1 OATC (RO1)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L4	No
5.	Plant Operator – U1 BOP (PO1)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L5	No
6.	Reactor Operator – U2 OATC (RO2)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L6	No
7.	Plant Operator – U2 BOP (PO2)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L7	No
8.	Shift Technical Advisor (STA)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L8	No
9.	CR Communicator (CM1) (Equipment Operator)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L15 T5/L8	No ^{Note 1}

Line	On-shift Position	Emergency Plan Reference	Role in Table#/Line#	Action Required?
10.	CR Communicator (CM2) (Reactor Operator)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L16 T5/L8 T5/L12	No ^{Note 1}
11.	Equipment Operator (EO1)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L9	No
12.	Equipment Operator (EO2)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L10	No
13.	Equipment Operator (EO3)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L11	No
14.	Equipment Operator (EO4)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L12	No
15.	Equipment Operator (EO5)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L13	No
16.	Equipment Operator – Radwaste Operator (EO6)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L14	No
17.	RP Technician (RP1)	PSEG Nuclear LLC – EP, Figure 3-1	T4/L1	No
18.	RP Technician (RP2)	PSEG Nuclear LLC – EP, Figure 3-1	T4/L3	No
19.	Shift Maintenance Supervisor (SMS)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L17	No
20.	Scheduled I&C Technician (IC1)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L18	No
21.	Shift Electrician (EM1)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L19	No
22.	Site Protection (SP2)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L20	No
23.	Site Protection (SP3)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L21	No

Line	On-shift Position	Emergency Plan Reference	Role in Table#/Line#	Action Required?
24.	Site Protection (SP4)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L22	No ^{Note 2}
25.	Site Protection (SP5)	PSEG Nuclear LLC – EP, Figure 3-1	T2/L23	No
26.	Maintenance Mechanic (MM1)	N/A	T2/L24	Yes ^{Note 3}
27.	Maintenance Mechanic (MM2 – HCGS)	N/A	T2/L25	Yes ^{Note 3}
28.	Security	PSEG Nuclear LLC – EP, Figure 3-1	T5/L14	No

Notes: Note 1 - No conflict; Table 2 and Table 5 functions are the same.
Note 2 – Assumes that venting hydrogen from generators will be addressed as part of FSG-5 approval and familiarization.
Note 3 – Establish administrative controls to ensure availability of on-shift MMs.

APPENDIX 1

TABLE 2 - Plant Operations & Safe Shutdown

**Two Units - One Control Room
Minimum Operations Crew Necessary to Implement
AOPs and EOPs, FSGs, or SAMGs if applicable**

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
1.	Shift Manager	Shift Manager	Operator Training
2.	Shift Supervisor	Control Room Supervisor – U1 (SRO1)	Operator Training
3.	Shift Supervisor	Control Room Supervisor – U2 (SRO2)	Operator Training
4.	Reactor Operator (OATC)	Reactor Operator – U1 (RO1)	Operator Training
5.	Reactor Operator (BOP)	Plant Operator – U1 (PO1)	Operator Training
6.	Reactor Operator (OATC)	Reactor Operator – U2 (RO2)	Operator Training
7.	Reactor Operator (BOP)	Plant Operator – U2 (PO2)	Operator Training
8.	Shift Technical Advisor	Shift Technical Advisor (STA)	Operator Training
9.	Auxiliary Operator	Equipment Operator (EO1)	Operator Training
10.	Auxiliary Operator	Equipment Operator (EO2)	Operator Training
11.	Auxiliary Operator	Equipment Operator (EO3)	Operator Training
12.	Auxiliary Operator	Equipment Operator (EO4)	Operator Training
13.	Auxiliary Operator	Equipment Operator (EO5)	Operator Training
14.	Auxiliary Operator	Equipment Operator (EO6)	Operator Training
15.	Auxiliary Operator	Control Room Communicator (CM1)	EP Training
16.	Reactor Operator	Control Room Communicator (CM2)	EP Training

Notes: See Tables 2A and 2B for AOP/EOP/FSG support actions for hurricane and tornado BDBEE, respectively.

APPENDIX 1

TABLE 2 - Plant Operations & Safe Shutdown (continued)

**Two Units - One Control Room
Other (non-Operations) Personnel Necessary to Implement
AOPs and EOPs, FSGs, or SAMGs if applicable**

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
17.	Shift Maintenance Supv	Shift Maintenance Supervisor (SMS)	EP/Maintenance Training
18.	I&C Technician	Scheduled I&C Technician (IC1)	I&C Training
19.	Electrician	Shift Electrician (EM1)	Electrical Mnt Training
20.	Fire Brigade	Site Protection (SP2)	Fire Brigade Training
21.	Fire Brigade	Site Protection (SP3)	Fire Brigade Training
22.	Fire Brigade	Site Protection (SP4)	Fire Brigade Training
23.	Fire Brigade	Site Protection (SP5)	Fire Brigade Training
24.	Maintenance	Maintenance Mechanic (MM1)	Maintenance Training
25.	Maintenance	Maintenance Mechanic (MM2) (HCGS)	Maintenance Training

Notes: See Tables 2A and 2B for AOP/EOP/FSG support actions for hurricane and tornado BDBEE, respectively.

APPENDIX 1

Table 2A – Procedure Task Timing (Hurricane Response)

APPENDIX 1

Table 2B – Procedure Task Timing (Tornado Response)

APPENDIX 1**TABLE 3 – Firefighting**

Line	Performed By	Task Analysis Controlling Method
1.	Not required by scenario	N/A
2.	Not required by scenario	N/A
3.	Not required by scenario	N/A
4.	Not required by scenario	N/A
5.	Not required by scenario	N/A

Notes: Fire Brigade response not required for this event.

APPENDIX 1 TABLE 4 – Radiation Protection & Chemistry

Line	Position Performing Function/Task	Performance Time Period After Event Initiation														
		Minutes						Hours								
		0-10	10-20	20-30	30-40	40-50	50-60	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10
1.	In-Plant Survey On-Shift Position: RP1		X													
2.	Out of Plant Survey On-Shift Position: RP2															
3.	Personnel Monitoring On-Shift Position:		X (Control Point Coverage)													
4.	Job Coverage On-Shift Position:															
5.	Offsite Radiological Assessment On-Shift Position: RP															
6.	Other Site-Specific RP – Describe: On-Shift Position:															
7.	Chemistry function/task #1 – Describe: On-Shift Position: CT1 ^{Note 1}															
8.	Chemistry function/task #2 – Describe: On-Shift Position: CT1 ^{Note 1}															

Notes: Note 1 - The Phase 2 scenario did not result in the use of this on-shift position. Augmented resources available to support actions after T=6 hours – no actions identified requiring support.

APPENDIX 1 TABLE 5 – Emergency Plan Implementation

Line	Function/Task	On-Shift Position
1.	Declare the Emergency Classification Level (ECL)	Shift Manager
2.	Approve Offsite Protective Action Recommendations	Shift Manager
3.	Approve content of State/local notifications	Shift Manager
4.	Approve extension to allowable dose limits	Not Required
5.	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	Shift Manager
6.	ERO notification	Shift Manager ^{Note 1}
7.	Complete State/local notification form	Shift Manager
8.	Perform State/local notifications	CM1 CM2
9.	Complete NRC event notification form	Shift Manager
10.	Activate ERDS	Not Available
11.	Offsite radiological assessment	Not Available ^{Note 2}
12.	Perform NRC notifications	CM2
13.	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	Shift Manager
14.	Personnel accountability	Security

Notes: Note 1 – Self activation of ERO based on event (wide spread loss of grid)
 Note 2 – Dose Assessment capability is impacted by ELAP – no data available to perform dose assessment. In addition, no radiological release exists – dose assessment not required.