

PSEG Nuclear LLC  
P.O. Box 236, Hancocks Bridge, NJ 08038-0236



Order EA-12-049

LR-N16-0137

**AUG 24 2016**

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

Hope Creek Generating Station  
Renewed Facility Operating License No. NPF-57  
NRC Docket No. 50-354

**Subject:** PSEG Nuclear LLC's Seventh Six-Month Status Report for the Hope Creek Generating Station in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)

**References:**

1. NRC Order Number EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012
2. PSEG Letter LR-N13-0031, "PSEG Nuclear LLC's Overall Integrated Plan for the Hope Creek Generating Station in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated February 27, 2013
3. PSEG Letter LR-N16-0042, "PSEG Nuclear LLC's Sixth Six-Month Status Report for the Hope Creek Generating Station in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated February 29, 2016

4. NRC Letter to PSEG, "Hope Creek Generating Station – Relaxation of the Schedule Requirements For Order EA-12-049 'Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events,'" dated May 20, 2014
5. NRC Letter to PSEG, "Hope Creek Generating Station – Relaxation of the Schedule Requirements For Order EA-12-049 'Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events,'" dated April 29, 2015
6. PSEG Letter LR-N15-0190, "Intermediate Implementation Milestone Change for NRC Order EA-12-049, 'Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events' – Hope Creek Generating Station," dated December 14, 2015

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Order EA-12-049 (Reference 1) to PSEG Nuclear LLC (PSEG). NRC Order EA-12-049 was immediately effective and directed PSEG to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities in the event of a beyond-design-basis external event. In accordance with Condition IV.C.1.a of NRC Order EA-12-049, PSEG submitted an Overall Integrated Plan (OIP) for the Hope Creek Generating Station (HCGS) on February 27, 2013 (Reference 2). Condition IV.C.2 of NRC Order EA-12-049 requires six-month status reports to delineate the progress made in implementing the requirements of the Order. Attachment 1 to this letter provides the seventh six-month status report, which summarizes progress made in implementing the requirements of NRC Order EA-12-049 at HCGS since the previous update provided in Reference 3. Attachment 1 reflects the schedule relaxations granted by the NRC in References 4 and 5, and PSEG's planned installation of the alternate FLEX mechanical connection during the fall 2016 refueling outage, as described in Reference 6.

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There are no regulatory commitments contained in this letter. If you have any questions or require additional information, please do not hesitate to contact Mr. Brian Thomas at 856-339-2022.

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

Executed on August 24, 2016  
(Date)

Sincerely,



Paul J. Davison  
Site Vice President  
Hope Creek Generating Station

Attachment 1: Hope Creek Generating Station Seventh Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

cc: Mr. Daniel Dorman, Administrator, Region I, NRC  
Ms. Carleen Parker, Project Manager, NRC/NRR/DORL  
Mr. Justin Hawkins, NRC Senior Resident Inspector, Hope Creek  
Mr. John Boska, Senior Project Manager, NRC/NRR/JLD  
Mr. Patrick Mulligan, Chief, NJBNE  
Mr. Thomas MacEwen, Hope Creek Commitment Tracking Coordinator  
Mr. Lee Marabella, PSEG Commitment Coordinator – Corporate

LR-N16-0137

**Attachment 1**

**Hope Creek Generating Station Seventh Six-Month Status Report for the  
Implementation of Order EA-12-049, Order Modifying Licenses with Regard to  
Requirements for Mitigation Strategies for Beyond-Design-Basis External Events**

References in this attachment are provided in Section 8.

## **1 Introduction**

PSEG Nuclear LLC (PSEG) developed an Overall Integrated Plan (OIP) (Reference 1) for the Hope Creek Generating Station (HCGS), documenting the diverse and flexible coping strategies (FLEX) in response to NRC Order EA-12-049 (Reference 2). In References 3 through 8, PSEG provided six-month status reports associated with implementation of the requirements of NRC Order EA-12-049. This report is the seventh six-month status report, which provides implementation status and progress since the previous report (Reference 8). This update follows the guidance in Section 13.2 of Nuclear Energy Institute (NEI) Report 12-06, Revision 0 (Reference 9), which states that the six-month status reports should include an update of milestone accomplishments since the previous report, changes to the compliance method, schedule, and the need for relief and the basis for relief, if applicable.

This status report reflects the schedule relaxation requests that were approved by the NRC in References 10 and 11. PSEG has completed activities to support implementation of the FLEX strategies at HCGS as of December 18, 2015, and will achieve full compliance with NRC Order EA-12-049 prior to startup from the fall 2016 refueling outage (H1R20). The actions necessary to achieve full compliance prior to startup from the H1R20 outage include completion of design changes and evaluations for the hardened torus vent in accordance with NRC Order EA-13-109 (Reference 12), and installation of the alternate FLEX mechanical connection to the Residual Heat Removal system as described in Reference 13.

## **2 Milestone Accomplishments**

PSEG has completed the milestone to develop modifications since the February 2016 update (Reference 8). The following HCGS FLEX milestones have been completed:

- Submit Overall Integrated Plan - PSEG submitted the HCGS FLEX OIP to the NRC via Reference 1.
- Develop FLEX Strategies
- Develop Modifications
- Develop FLEX Support Guidelines (FSGs)
- Approve FSGs – PSEG issued FSGs to implement the HCGS FLEX strategies.
- Validation Walk-throughs or Demonstrations of FLEX Strategies and Procedures
- Perform Staffing Analysis – PSEG completed the HCGS Phase 2 staffing analysis (Reference 15) as required by the 10 CFR 50.54(f) information request dated March 12, 2012 (Reference 16). The HCGS Phase 2 staffing analysis addresses resources needed to implement FLEX strategies during simultaneous extended loss of AC power scenarios at HCGS and Salem Generating Station, Units 1 and 2.
- Develop Training Plan

- Implement Training – Initial training has been completed.
- Develop Strategies/Contract with Regional Response Center (RRC) - PSEG Nuclear is a member of the Strategic Alliance for FLEX Emergency Response (SAFER) and has a SAFER response plan to coordinate delivery of additional equipment from the National SAFER Response Centers (formerly known as Regional Response Centers).
- Create Maintenance Procedures – periodic inventory and maintenance of FLEX equipment are addressed by procedures and preventive maintenance tasks.
- Emergency Preparedness (EP) Communications Improvements

### 3 Milestone Schedule Status

The following table provides an update to HCGS FLEX OIP milestones. The table provides the activity status of each item, and whether the original expected completion date has changed. Original target completion dates are based on the original NRC Order EA-12-049 schedule requirement of compliance prior to startup from the spring 2015 refueling outage. The current milestones reflect the schedule relaxations in References 10 and 11.

| <b>Milestone</b>                      | <b>Original Target Completion Date</b> | <b>Activity Status</b>    | <b>Revised Target Completion Date</b> |
|---------------------------------------|--|---------------------------|---------------------------------------|
| <b>Submit Overall Integrated Plan</b> | Feb 2013                               | Complete                  |                                       |
| <b>Six-Month Status Update</b>        | Aug 2013                               | Complete                  |                                       |
|                                       | Feb 2014                               | Complete                  |                                       |
|                                       | Aug 2014                               | Complete                  |                                       |
|                                       | Feb 2015                               | Complete                  |                                       |
|                                       | Aug 2015                               | Complete                  |                                       |
|                                       | Feb 2016                               | Complete                  |                                       |
|                                       | Aug 2016                               | Complete With This Report |                                       |
| <b>Develop Strategies</b>             | May 2013                               | Complete                  |                                       |
| <b>Modifications</b>                  |  |                           |                                       |
| Develop Modifications                 | Apr 2014                               | Complete                  | Apr 2016                              |
| Implement Modifications               | Apr 2015                               | Started                   | Nov 2016                              |

| <b>Milestone</b>  | <b>Original Target Completion Date</b> | <b>Activity Status</b> | <b>Revised Target Completion Date</b> |
|---|--|------------------------|---------------------------------------|
| <b>FLEX Support Guidelines (FSGs)</b>   |  |                        |                                       |
| Develop FSGs  | Dec 2013                               | Complete               | Apr 2015                              |
| Approve FSGs  | Oct 2015                               | Complete               | Dec 2015                              |
| Validation Walk-throughs or Demonstrations of FLEX Strategies and Procedures  | May 2015                               | Complete               | Dec 2015                              |
| <b>Perform Staffing Analysis</b>  | Dec 2013                               | Complete               | Dec 2014                              |
| <b>Develop Training Plan</b>  | Jun 2014                               | Complete               | Jan 2015                              |
| <b>Implement Training</b>   | Dec 2014                               | Complete               | Dec 2015                              |
| <b>Develop Strategies / Contract with National SAFER Response Center (formerly called "Regional Response Center")</b> | Oct 2013                               | Complete               | Feb 2015                              |
| <b>Procure Equipment</b>  | Dec 2013                               | Started                | Nov 2016                              |
| <b>Create Maintenance Procedures</b>  | Jun 2014                               | Complete               | Dec 2015                              |
| <b>Emergency Preparedness (EP) Communications Improvements</b>  | Jun 2014                               | Complete               | May 2015                              |
| <b>HC Implementation Outage</b>   | Apr 2015                               | Not Started            | Nov 2016                              |
| <b>Report to NRC When Full Compliance is Achieved</b>   | Aug 2015                               | Not Started            | Jan 2017                              |

#### **4 Changes to Compliance Method**

Changes to the compliance method are summarized in the February 2016 status report (Reference 8). There are no additional changes for this reporting period.

## **5 Need for Relief/Relaxation and Basis for the Relief/Relaxation**

By letter dated April 16, 2014 (Reference 18), PSEG requested schedule relaxation to defer HCGS full compliance with NRC Order EA-12-049, from the HCGS Refueling Outage 19 (H1R19) in spring 2015, to H1R20 in fall 2016. This relaxation request was approved via Reference 10 in order to allow time for implementation of torus venting requirements as needed to support compliance with NRC Order EA-12-049, and is consistent with the schedule for implementation of severe accident capable torus venting requirements in NRC Order EA-13-109 (Reference 12).

In order to allow sufficient time to implement changes to the HCGS FLEX strategies, PSEG requested additional schedule relaxation by letter dated March 11, 2015 (Reference 19), and supplemented the request by letter dated April 13, 2015 (Reference 20). The NRC granted the requested schedule relaxation on April 29, 2015 (Reference 11), which required completion of the activities to implement NRC Order EA-12-049, other than those associated with the severe accident capable torus vent, by December 18, 2015. By letter dated December 14, 2015 (Reference 13), PSEG notified the NRC of the need to defer installation of the alternate FLEX mechanical connection to the Residual Heat Removal (RHR) system due to seat leakage of a locked closed valve that was intended to serve as the blocking point during on-line installation. PSEG has prepared a design change package to complete installation of the RHR tie-in for the alternate FLEX connection during the fall 2016 refueling outage.



**6 Open Items from Overall Integrated Plan and Draft Safety Evaluation**

Resolution of items identified in the NRC’s interim staff evaluation (ISE) for HCGS (Reference 22) is being addressed as part of the mitigation strategies audit process. The NRC audit report dated March 25, 2016 (Reference 23) identified one item remaining open (Item 18, below), pending revision of the FLEX hydraulic analysis, which has since been completed. Closed items from the February 2016 update (Reference 8) are repeated below for completeness.

| ID | Item Ref.                                     | Description   | Status  |
|----|---|---|---|
| 1. | Generic Concern – Battery Life                | HCGS is currently working on extending the battery duty cycle and is following the industry position on battery life as outlined in the Nuclear Energy Institute (NEI) white paper dated August 27, 2013 (Reference 24) and endorsed by NRC via letter to NEI dated September 16, 2013 (Reference 25).  | Complete - Coping analyses for 125 VDC and 250 VDC batteries have been completed using the NRC-endorsed white paper.  |
| 2. | Generic Concern - MAAP                        | HCGS is using the Modular Accident Analysis Program (MAAP) to complete the development of FLEX timelines and strategies, consistent with the NRC endorsement letter to NEI dated October 3, 2013 (Reference 26).  | Complete - Plant-specific MAAP4 analyses have been performed consistent with the NRC endorsement letter.  |
| 3. | Generic Concern – Shutdown / Refueling Modes  | HCGS will enhance shutdown risk processes and procedures using the supplemental guidance provided in the NEI position paper entitled “Shutdown / Refueling Modes,” dated September 18, 2013 (Reference 27) and endorsed by the NRC via letter to NEI dated September 30, 2013 (Reference 28).   | Complete -this requirement is addressed via a new FSG for shutdown cooling modes and changes to existing outage management and equipment control procedures.                              |
| 4. | Generic Concern – Preventive Maintenance (PM) | As part of the development of FLEX maintenance and testing programs, HCGS will use the EPRI Technical Report entitled “Nuclear Maintenance Applications Center: Preventative Maintenance Basis for FLEX Equipment,” transmitted to NRC via NEI letter dated October 3, 2013 (Reference 29) and endorsed by NRC letter dated October 7, 2013 (Reference 30). | Complete - PSEG developed FLEX equipment PM tasks using the guidance in the NRC-endorsed EPRI guidance, EPRI or PSEG templates appropriate for the equipment, and vendor recommendations. |

| ID | Item Ref.  | Description  | Status  |
|----|--|--|---|
| 5. | Generic Concern – Anticipatory Venting<br>OI 3.2.3.C | With regard to maintaining containment, the implementation of Boiling Water Reactor Owners Group (BWROG) Emergency Procedure Guidelines / Severe Accident Guidelines (EPG/SAG), Revision 3, including any associated plant-specific evaluations, must be completed in accordance with the provisions of NRC letter dated January 9, 2014 (Reference 31).   | Complete - PSEG is currently implementing the containment venting guidance of Revision 3 to the BWROG EPG to support the FLEX strategies. SAG revisions to support severe accident containment venting will be implemented prior to startup from the fall 2016 outage.  |
| 6. | OI 3.2.4.8.E   | The use of pre-staged FLEX generators appears to be an alternative to NEI 12-06. The licensee has not provided sufficient information to demonstrate that the approach meets the NEI 12-06 provisions for pre-staged portable equipment. Additional information is needed from the licensee to determine whether the proposed approach provides an equivalent level of flexibility for responding to an undefined event as would be provided through conformance with NEI 12-06. | Complete - PSEG has evaluated the staging location of the FLEX generators as part of the overall storage and deployment strategy with consideration of the applicable site external hazards. The evaluation concludes that FLEX generator storage and deployment provide reasonable assurance that no single external event would defeat the FLEX strategy. |
| 7. | CI 3.1.1.1.A   | Confirm licensee's evaluation of the HCGS Unit 2 structures verifies that the structures will meet the considerations described in NEI 12-06, Section 5.3.1 (protection against seismic hazards).  | Complete - PSEG has determined the HCGS Unit 2 reactor building, including the floor at grade elevation 102 ft. and the roof areas being used for pre-staged FLEX generators and cable reel enclosures, is structurally adequate for FLEX equipment storage.  |

| ID  | Item Ref.    | Description  | Status   |
|-----|--------------|--|--|
| 8.  | CI 3.1.2.3.A | Confirm that the procedures and programs for deployment of portable equipment in a flooding event conforms to NEI 12-06, Section 6.2.3 considerations 1 (incorporation of actions necessary to support flooding deployment considerations into procedures) and 2 (additional guidance may be required to address the deployment of FLEX for flooded conditions). Additionally, procedures and programs need to address hazard concerns related to high winds, snow, ice and extreme cold and high temperatures.  | Complete - with procedure issuance to support the 12/18/2015 FLEX implementation milestone.            |
| 9.  | CI 3.1.3.1.A | Confirm that the licensee's separation of equipment stored outside is sufficient to preclude all sets of equipment from being damaged by a single tornado.   | Complete - PSEG evaluated outdoor storage of FLEX equipment as summarized in Section 4 of Reference 8. |
| 10. | CI 3.2.1.1.A | From the June 2013 position paper (endorsed by the NRC via Reference 26), benchmarks must be identified and discussed which demonstrate that MAAP4 is an appropriate code for the simulation of an ELAP event at your facility.  | Complete - Same as Item #2, Generic Concern – MAAP.  |
| 11. | CI 3.2.1.1.B | Confirm that the collapsed vessel level in the MAAP4 analysis remains above Top of Active Fuel (TAF) and the cool down rate is within technical specification limits.  | Complete - Same as Item #2, Generic Concern – MAAP.  |
| 12. | CI 3.2.1.1.C | Confirm that MAAP4 is used in accordance with Sections 4.1, 4.2, 4.3, 4.4, and 4.5 of the June 2013 position paper (endorsed by the NRC via Reference 26).   | Complete - Same as Item #2, Generic Concern - MAAP.  |
| 13. | CI 3.2.1.1.D | Confirm that in using MAAP4, the licensee identifies and justifies the subset of key modeling parameters cited from Tables 4-1 through 4-6 of the "MAAP4 Application Guidance, Desktop Reference for Using MAAP4 Software, Revision 2" (Electric Power Research Institute Report 1020236). This should include response at a plant-specific level regarding specific modeling options and parameter choices for key models that would be expected to substantially affect the ELAP analysis performed for that licensee's plant. Although some suggested key phenomena are identified below, other parameters considered important in the simulation of the ELAP event by the vendor / licensee should also be included as follows: Nodalization, General two-phase flow modeling, Modeling of heat transfer and losses, Choked flow, Vent line pressure losses, and Decay heat. | Complete - Same as Item #2, Generic Concern – MAAP.  |

| ID  | Item Ref.    | Description   | Status   |
|-----|--------------|---|--|
| 14. | CI 3.2.1.1.E | Confirm that the specific MAAP4 analysis case that was used to validate the timing of mitigating strategies in the Integrated Plan is identified and available for NRC staff to view. Alternately, a comparable level of information may be included in the supplemental response. In either case, the analysis should include a plot of the collapsed vessel level to confirm that TAF is not reached (the elevation of the TAF should be provided) and a plot of the temperature cool down to confirm that the cool down is within technical specification limits.  | Complete - Same as Item #2, Generic Concern – MAAP.  |
| 15. | CI 3.2.1.2.A | Insufficient information was provided relative to recirculation pump seal or other sources of leakage used in the ELAP analysis. Additional information is required to evaluate the amount of seal leakage that was used in the HCGS transient analyses and how the seal leakage was determined. This information will need to include the technical basis for the assumptions made regarding the leakage rate through the recirculation pump seals and also other sources. Also include the assumed pressure-dependence of the leakage rate, and whether the leakage was determined or assumed to be single-phase liquid, two-phase mixture, or steam at the donor cell, and discuss how mixing the leakage flow with the drywell atmosphere is modeled. | Complete - Same as Item #2, Generic Concern – MAAP.  |
| 16. | CI 3.2.1.3.A | The SOE Timeline in the Integrated Plan is tentative. The licensee addressed this issue during the audit process by describing that the SOE timeline presented in the Integrated Plan will be finalized based on plant-specific analysis, procedure development and timeline validation. Confirm that the final SOE timeline is acceptable.   | Complete - final documentation of the event timelines supported the FLEX implementation milestone of 12/18/15.   |
| 17. | CI 3.2.1.3.B | The licensee stated that they are performing a HCGS specific MAAP4 analysis consistent with the NRC endorsement letter to NEI dated October 3, 2013 (ADAMS Accession No. ML13275A318) (Reference 26), to validate the timeline and NEDC-33771-P applicability. Confirm that the results of the evaluation and validation of the SOE timeline are acceptable.  | Complete - part of resolution of the generic concern regarding use of MAAP for containment analyses (Item 2, above), and completion of timeline validation (Item #16, CI 3.2.1.3.A). |

| ID  | Item Ref.    | Description  | Status   |
|-----|--------------|--|--|
| 18. | CI 3.2.1.4.A | Additional technical basis or a supporting analysis is needed for both FLEX pumping system (one engine/pump located at the SWIS and one motor/pump located in the reactor building) capabilities considering the pressure within the RPV and the loss of pressure along with details regarding the FLEX pump supply line routes, length of runs, connecting fittings, to show that the pumps are capable of injecting water into the RPV with a sufficient rate to maintain and recover core inventory for both the primary and alternate flow paths as well as supplying water [to] the SFP. The licensee addressed these issues during the audit process and stated that this analysis will be performed as part of the design change process. Confirm that the analysis results are acceptable. | Complete – the plant-specific FLEX analysis was revised and provided to the NRC staff via the e-portal subsequent to issuance of the NRC’s onsite audit report (Reference 23). |
| 19. | CI 3.2.1.6.A | Confirm that the results of the final sizing calculations for the SRVs accumulators, the final temperature profile of the drywell, DC coping results and the results of the GOTHIC temperature modeling for the reactor building are acceptable.   | Complete - based on plant-specific SRV accumulator sizing, MAAP analyses, and GOTHIC results.  |
| 20. | CI 3.2.2.A   | Confirm that the licensee’s final SFP cooling timeline is valid for the required response actions  | Complete - The FLEX strategy is capable of providing SFP cooling with consideration of timelines and environmental conditions during an ELAP.                                  |
| 21. | CI 3.2.3.A   | A site-specific analysis (MAAP) will be performed to determine the correct time to open the HCVS vent and the expected drywell and wetwell temperatures during the Beyond-Design-Basis EE. This information will be included in a future six-month update. The site-specific analysis needs to include a listing of critical drywell components that may be affected by the elevated temperatures (e.g., drywell seals and penetrations). Confirm that the analysis results are acceptable.  | Complete - plant-specific MAAP analysis temperature results provide margin for critical equipment that is qualified to design basis accident conditions.                       |
| 22. | CI 3.2.3.B   | The NRC staff questioned the ability of RCIC to operate with suction temperatures up to 230 degrees Fahrenheit. During the audit process, the licensee addressed this issue by stating that a RCIC durability study is in progress. Confirm that the results are acceptable.   | Complete - The FLEX strategies and supporting MAAP analyses only credit RCIC operation at fluid temperatures up to 215 degrees F, consistent with long term RCIC reliability.  |

| ID  | Item Ref.    | Description  | Status  |
|-----|--------------|--|---|
| 23. | CI 3.2.4.2.A | Confirm that the GOTHIC analysis and/or technical evaluation performed to demonstrate the adequacy of the ventilation provided in all plant strategic areas (including pathways for access to equipment) to support essential equipment operation throughout all phases of an ELAP is acceptable.                                      | Complete – based on GOTHIC modeling and room temperature calculations.  |
| 24. | CI 3.2.4.2.B | Confirm that the effects of elevated or lowered temperatures in the battery room, especially if the ELAP is due to a high or low temperature hazard, have been considered. Confirm the adequacy of the ventilation provided in the battery room to protect the batteries from the effects of extreme high and low temperatures.        | Complete - based on GOTHIC results and a separate evaluation of low temperatures.   |
| 25. | CI 3.2.4.2.C | Confirm that the GOTHIC calculations for the battery rooms include the effects of hydrogen accumulation and confirm the actions necessary to prevent unacceptable hydrogen accumulation.   | Complete - GOTHIC analyses assume the battery room doors 5541A and 5545A are opened at four hours and show that the hydrogen concentration remains below 1 percent. |
| 26. | CI 3.2.4.4.A | Confirm that the upgrades to the plant communication systems discussed in the licensee communications assessment (References 17 and 21) in response to the March 12, 2012, 50.54(f) request for information letter for HCGS and documented in the staff analysis (ADAMS Accession No. ML13130A387) (Reference 14) have been completed. | Complete - PSEG has implemented improvements to radio and satellite phone communications capability.  |
| 27. | CI 3.2.4.6.A | Confirm that the GOTHIC modeling and room temperature calculations of plant strategic areas (e.g. MCR, RCIC room, HPCI room (if needed), torus room, and battery rooms including pathways for access to equipment) show acceptable results for personnel habitability and equipment capability.  | Complete – based on GOTHIC modeling and room temperature calculations.  |
| 28. | CI 3.2.4.6.B | Confirm that potential high temperature and high humidity in the SFP and fuel handling floor area has been addressed with regard to accessibility.   | Complete – based on evaluation of timeline constraints and GOTHIC calculations.   |

| ID  | Item Ref.     | Description   | Status   |
|-----|---------------|---|--|
| 29. | CI 3.2.4.8.A  | Confirm that the design of the FLEX electrical hookups include the details on how to connect to, and interface with existing plant equipment.   | Complete - FLEX electrical connections and interfaces with plant equipment are designed for ease of installation using prefabricated connectors or terminal lugs. FSGs include guidance for connections. |
| 30. | CI 3.2.4.8.B  | Confirm that the sizing of the FLEX diesel generators (DGs) is adequate to supply the planned loads.  | Complete - Sizing calculations for the Phase 2 and Phase 3 FLEX DGs support steady state operation of the FLEX loads and starting of the largest single load.  |
| 31. | CI 3.2.4.10.A | Confirm that the analysis of battery load profiles for the safety related 125 and 250 Vdc batteries for a Beyond-Design-Basis External Event demonstrate satisfactory load profiles and battery life. | Complete - Coping analyses for 125 VDC and 250 VDC batteries have been completed using the NRC-endorsed white paper.   |

## **7 Potential Draft Safety Evaluation Impacts**

There are no potential impacts to the Draft Safety Evaluation identified at this time.

## **8 References**

1. PSEG letter LR-N13-0031, "PSEG Nuclear LLC's Overall Integrated Plan for the Hope Creek Generating Station in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated February 27, 2013
2. NRC Order Number EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012
3. PSEG Letter LR-N13-0173, "PSEG Nuclear LLC's First Six-Month Status Report for the Hope Creek Generating Station in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated August 22, 2013
4. PSEG Letter LR-N14-0025, "PSEG Nuclear LLC's Second Six-Month Status Report for the Hope Creek Generating Station in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated February 25, 2014
5. PSEG Letter LR-N14-0184, "PSEG Nuclear LLC's Third Six-Month Status Report for the Hope Creek Generating Station in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated August 26, 2014
6. PSEG Letter LR-N15-0022, "PSEG Nuclear LLC's Fourth Six-Month Status Report for the Hope Creek Generating Station in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated February 18, 2015
7. PSEG Letter LR-N15-0169, "PSEG Nuclear LLC's Fifth Six-Month Status Report for the Hope Creek Generating Station in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated August 27, 2015



8. PSEG Letter LR-N16-0042, "PSEG Nuclear LLC's Sixth Six-Month Status Report for the Hope Creek Generating Station in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated February 29, 2016
9. Nuclear Energy Institute (NEI) Report NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, dated August 2012
10. NRC Letter to PSEG, "Hope Creek Generating Station – Relaxation of the Schedule Requirements For Order EA-12-049 'Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events,'" dated May 20, 2014
11. NRC Letter to PSEG, "Hope Creek Generating Station – Relaxation of the Schedule Requirements For Order EA-12-049 'Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events,'" dated April 29, 2015
12. NRC Order EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Effective Immediately)," dated June 6, 2013
13. PSEG Letter LR-N15-0190, "Intermediate Implementation Milestone Change for NRC Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" – Hope Creek Generating Station," dated December 14, 2015
14. NRC Letter to PSEG, "Hope Creek Generating Station and Salem Nuclear Generating Station, Unit Nos. 1 and 2 – Staff Assessment in Response to 10 CFR 50.54(f) Recommendation 9.3 Communications Assessment (TAC Nos. ME9959, ME9984, and ME9985), dated June 3, 2013
15. PSEG Letter LR-N14-0248, "Hope Creek 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, dated December 9, 2014
16. U.S. Nuclear Regulatory Commission (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
17. PSEG letter LR-N13-0026, "PSEG Nuclear LLC's Response to NRC Follow-up Letter on Technical Issues for Resolution Regarding Licensee Communication Submittals Associated with Fukushima Near-Term Task Force Recommendation 9.3," dated February 21, 2013

18. PSEG Letter LR-N14-0093, "PSEG Nuclear LLC's Request for Relaxation from NRC Order EA-12-049, 'Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events' - Hope Creek Generating Station," dated April 16, 2014
19. PSEG Letter LR-N15-0055, "PSEG Nuclear LLC's Request for Relaxation from Schedule Requirements of NRC Order EA-12-049, 'Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events' – Hope Creek Generating Station," dated March 11, 2015
20. PSEG Letter LR-N15-0087, "Supplement to the Request for Relaxation from Schedule Requirements of NRC Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events" – Hope Creek Generating Station," dated April 13, 2015
21. PSEG Letter LR-N12-0351, "PSEG Nuclear LLC's Assessment Report for Communications During an Extended Loss of AC Power," dated October 31, 2012
22. NRC Letter to PSEG, "Hope Creek Generating Station – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies) (TAC NO. MF0867)," dated February 11, 2014
23. NRC Letter to PSEG, "Hope Creek Generating Station – Report for the Onsite Audit Regarding Implementation of Mitigating Strategies and Reliable Spent Fuel Pool Instrumentation Related to Orders EA-12-049 and EA-12-051 (TAC NOS. MF0867 and MF1031)," dated March 25, 2016
24. NEI letter to NRC, "EA-12-049 Mitigating Strategies Resolution of Extended Battery Duty Cycles Generic Concern," dated August 27, 2013 (ADAMS Accession No. ML13241A186)
25. NRC letter to NEI, "Battery Life White Paper Endorsement," dated September 16, 2013 (ADAMS Accession No. ML13241A188)
26. NRC letter to NEI, "Mitigation Strategies Order EA-12-049, NEI Position Paper: MAAP Endorsement Letter," dated October 3, 2013 (ADAMS Accession No. ML13275A318)
27. NEI Position Paper, "Shutdown / Refueling Modes," dated September 18, 2013 (ADAMS Accession No. ML13273A514)
28. NRC letter to NEI, "Endorsement Letter: Mitigation Strategies Order EA-12-049, NEI Position Paper: Shutdown / Refueling Modes," dated September 30, 2013 (ADAMS Accession No. ML13267A382)
29. NEI letter to NRC, "EA-12-049 Mitigating Strategies Resolution of FLEX Equipment Maintenance and Testing Templates," dated October 3, 2013 (ADAMS Accession No. ML13276A573)
30. NRC letter to NEI, "Maintenance and Testing Endorsement Letter in Regards to Mitigation Strategies Order EA-12-049," dated October 7, 2013 (ADAMS Accession No. ML13276A224)

LR-N16-0137  
Attachment 1

31. NRC letter to NEI, "Nuclear Energy Institute, BWR Anticipatory Venting Letter in Regards to Order EA-12-049," dated January 9, 2014 (ADAMS Accession No. ML13358A206)