UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 11, 2014

Mr. Thomas Joyce
President and Chief Nuclear Officer
PSEG Nuclear LLC
P.O. Box 236, N09
Hancocks Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2 - PLAN FOR THE ONSITE AUDIT REGARDING IMPLEMENTATION OF MITIGATING STRATEGIES AND RELIABLE SPENT FUEL INSTRUMENTATION RELATED TO ORDERS EA-12-049 AND EA-12-051 (TAC NOS. MF0868, MF0869, MF0913, AND MF0914)

Dear Mr. Joyce:

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design-Basis External Events" and Order EA-12-051, "Order to Modify Licenses With Regard To Reliable Spent Fuel Pool Instrumentation," (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML12054A736 and ML12054A679, respectively). The orders require holders of operating reactor licenses and construction permits issued under Title 10 of the *Code of Federal Regulations* Part 50 to submit for review, Overall Integrated Plans (OIPs) including descriptions of how compliance with the requirements of Attachment 2 of each order will be achieved.

By letter dated February 28, 2013 (ADAMS Accession No. ML13059A296), PSEG Nuclear LLC (PSEG, the licensee) submitted its OIP for Salem Nuclear Generating Station, Unit Nos. 1 and 2 (Salem), in response to Order EA-12-049. By letters dated August 25, 2013, and February 25, 2014 (ADAMS Accession Nos. ML13239A097 and ML14058A230, respectively), PSEG submitted its first two six-month updates to the Overall Integrated Plan. By letter dated August 28, 2013 (ADAMS Accession No. ML13234A503), the NRC notified all licensees and construction permit holders that the staff is conducting audits of their responses to Order EA-12-049 in accordance with NRC Office of Nuclear Reactor Regulation (NRR) Instruction LIC-111, "Regulatory Audits" (ADAMS Accession No. ML082900195). This audit process led to the issuance of the Salem interim staff evaluation (ISE) and audit report (ADAMS Accession No. ML13339A667) and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML130640502), the licensee submitted its OIP for Salem in response to Order EA-12-051. By letter dated July 11, 2013 (ADAMS Accession No. ML13186A167), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated August 12, 2013, August 25, 2013, and February 25, 2014 (ADAMS Accession Nos. ML13225A363, ML13239A095, and ML14058A232, respectively), the licensee submitted its RAI responses and first two six-month updates to the OIP.

The NRC staff's review led to the issuance of the Salem ISE and RAI dated October 17, 2013 (ADAMS Accession No. ML13270A414). By letter dated March 26, 2014 (ADAMS Accession No. ML14083A620), the NRC notified all licensees and construction permit holders that the staff is conducting in-office and onsite audits of their responses to Order EA-12-051 in accordance with NRC NRR Office Instruction LIC-111 as discussed above.

The ongoing audit process, to include the in-office and onsite portions, allows the staff to assess whether it has enough information to make a safety evaluation of the Integrated Plans. The audit allows the staff to review open and confirmatory items from the mitigation strategies ISE, RAI responses from the spent fuel pool instrumentation ISE, the licensee's integrated plans, and other audit questions. Additionally, the staff gains a better understanding of submitted information, identifies additional information necessary for the licensee to supplement its plan, and identifies any staff potential concerns. The audit's onsite portion will occur prior to declarations of compliance for the first unit at each site.

This document outlines the on-site audit process that occurs after ISE issuance as licensees provide new or updated information via periodic updates, update audit information on e-portals, provide preliminary Overall Program Documents/Final Integrated Plans, and continue in-office audit communications with staff while proceeding towards compliance with the orders.

The staff plans to conduct an onsite audit at Salem in accordance with the enclosed audit plan from August 5-7, 2014.

If you have any questions, please contact me at 301-415-2901 or by e-mail at john.boska@nrc.gov.

Sincerely,

John P. Boska

John Boska, Senior Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos.: 50-272 and 50-311

Enclosure:
Audit plan

cc w/encl: Distribution via Listserv

Audit Plan
Salem Nuclear Generating Station, Unit Nos. 1 and 2

BACKGROUND AND AUDIT BASIS

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design-Basis External Events" and Order EA-12-051, "Order to Modify Licenses With Regard To Reliable Spent Fuel Pool Instrumentation," (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML12054A736 and ML12054A679, respectively). Order EA-12-049 directs licensees to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool (SFP) cooling capabilities in the event of a beyond-design-basis external event (BDBEE). Order EA-12-051 requires, in part, that all operating reactor sites have a reliable means of remotely monitoring wide-range SFP levels to support effective prioritization of event mitigation and recovery actions in the event of a BDBEE. The orders require holders of operating reactor licenses and construction permits issued under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50 to submit for review, Overall Integrated Plans (OIPs) including descriptions of how compliance with the requirements of Attachment 2 of each order will be achieved.

By letter dated February 28, 2013 (ADAMS Accession No. ML13059A296), PSEG Nuclear LLC (PSEG, the licensee) submitted its OIP for Salem Nuclear Generating Station, Unit Nos. 1 and 2 (Salem), in response to Order EA-12-049. By letters dated August 25, 2013, and February 25, 2014 (ADAMS Accession Nos. ML13239A097 and ML14058A230, respectively), PSEG submitted its first two six-month updates to the OIP. By letter dated August 28, 2013 (ADAMS Accession No. ML13234A503), the NRC notified all licensees and construction permit holders that the staff is conducting audits of their responses to Order EA-12-049 in accordance with NRC Office of Nuclear Reactor Regulation (NRR) Instruction LIC-111, "Regulatory Audits" (ADAMS Accession No. ML082900195). The purpose of the staff's audit is to determine the extent to which the licensees are proceeding on a path towards successful implementation of the actions needed to achieve full compliance with the order. This audit process led to the issuance of the Salem interim staff evaluation (ISE) and audit report (ADAMS Accession No. ML13339A667) and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML130640502), the licensee submitted its OIP for Salem in response to Order EA-12-051. By letter dated July 11, 2013 (ADAMS Accession No. ML13186A167), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated August 12, 2013, August 25, 2013, and February 25, 2014 (ADAMS Accession Nos. ML13225A363, ML13239A095, and ML14058A232, respectively), the licensee submitted its RAI responses and first two six-month updates to the OIP.

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The ongoing audit process, to include the in-office and onsite portions, allows the staff to assess whether it has enough information to make a safety evaluation of the Integrated Plans. The audit allows the staff to review open and confirmatory items from the mitigation strategies ISE, RAI responses from the spent fuel pool instrumentation (SFPI) ISE, the licensee's integrated plans, and other audit questions. Additionally, the staff gains a better understanding of submitted information, identifies additional information necessary for the licensee to supplement its plan, and identifies any staff potential concerns. The audit's onsite portion will occur prior to declarations of compliance for the first unit at each site.

This document outlines the onsite audit process that occurs after ISE issuance as licensees provide new or updated information via periodic updates, update audit information on e-portals, provide preliminary Overall Program Documents (OPDs)/Final Integrated Plans (FIPs), and continue in-office audit communications with staff while proceeding towards compliance with the orders.

Following the licensee's declarations of order compliance, the NRC staff will evaluate the OIPs as supplemented, the resulting site-specific OPDs/FIPs, and, as appropriate, other licensee submittals based on the requirements in the orders. For Order EA-12-049, the staff will make a safety determination regarding order compliance using the Nuclear Energy Institute (NEI) guidance document NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide" issued in August 2012 (ADAMS Accession No. ML12242A378), as endorsed by NRC interim staff guidance (ISG) JLD-ISG-2012-01 "Compliance with Order EA-12-049, 'Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events'" (ADAMS Accession No. ML12229A174) as providing one acceptable means of meeting the order requirements. For Order EA-12-051, the staff will make a safety determination regarding order compliance using the NEI guidance document NEI 12-02, "Industry Guidance for Compliance with NRC Order EA-12-051, 'To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation'" (ADAMS Accession No. ML12240A307), as endorsed, with exceptions and clarifications, by NRC ISG JLD-ISG-2012-03 "Compliance with Order EA-12-051, 'Reliable Spent Fuel Pool Instrumentation'" (ADAMS Accession No. ML12221A339) as providing one acceptable means of meeting the order requirements. Should the licensee propose an alternative strategy or other method deviating from the guidance, additional staff review will be required to evaluate if the alternative strategy complies with the applicable order.

AUDIT SCOPE

As discussed, onsite audits will be performed per NRR Office Instruction LIC-111, "Regulatory Audits," to support the development of safety evaluations. Site-specific OIPs and OPDs/FIPs rely on equipment and procedures that apply to all units at a site, therefore, audits will be planned to support the "first unit at each site." On-site audits for subsequent units at a site will be on an as-needed basis.

The purpose of the audits is to obtain and review information responsive to the Salem OIPs, as supplemented, open and confirmatory items from the mitigation strategies ISE, RAI responses from the SFPI ISE, and to observe and gain a better understanding of the basis for the site's overall programs to ensure the licensee is on the correct path for compliance with the Mitigation Strategies and SFPI orders. These may include, but are not limited to:

- Onsite review and discussion for the basis and approach for detailed analysis and calculations (Orders EA-12-049, EA-12-051);

- Walk-throughs of strategies and laydown of equipment to assess feasibility, timing, and effectiveness of a given mitigating strategy or integration of several strategies (Order EA-12-049);

- Storage, protection, access, and deployment feasibility and practicality for onsite portable equipment (Order EA-12-049);

- Evaluation of staging, access, and deployment of offsite resources to include Regional Response Center (RRC) provided equipment (Order EA-12-049); and

- Review dimensions and sizing of the SFP area, placement of the SFP level instrumentation, and applicable mounting methods and design criteria (Order EA-12-051).

NRC AUDIT TEAM

Title	Team Member
Team Lead	David Allsopp
Project Manager	John Boska
Technical Support	Diana Woodyatt
Technical Support	Michael Levine
Technical Support	Prem Sahay

NRC AUDIT TEAM – SUPPLEMENTAL MEMBERS

Title	Team Member
Branch Chief	Stewart Bailey

LOGISTICS

The audit will be conducted onsite at Salem on August 5-7, 2014. Entrance and exit briefings will be held with the licensee at the beginning and end of the audit, respectively, as well as daily briefings of team activities. Additional details will be addressed over the phone. A more detailed schedule is provided below.

A private conference room is requested for NRC audit team use with access to audit documentation upon arrival and as needed.

DELIVERABLES

An audit report/summary will be issued to the licensee within 45 days from the end of the audit.

INFORMATION NEEDS

- Materials/documentation provided in responses to open or confirmatory items and RAIs in the ISEs;
- OPD/FIP (current version), operator procedures, FLEX Support Guidelines (FSGs), operator training plans, RRC (SAFER) Salem Response Plan; and
- Materials/documentation for staff audit questions and/or licensee OIP identified open items as listed in the Part 2 table below

To provide supplemental input to the ongoing audit of documents submitted to the NRC and made available via e-portal, the onsite audit will have three components: 1) a review of the overall mitigating strategies for the site, including, if needed, walk-throughs of strategies and equipment laydown of select portions; 2) a review of material relating to open or confirmatory items and RAIs from the ISEs, staff audit questions, and licensee open items; and 3) additional specific issues requested by NRC technical reviewers related to preparation of a safety evaluation. Each part is described in more detail below:

Part 1 - Overall Mitigating Strategies and Program Review:

During the onsite audit, please be prepared to conduct a tabletop discussion of the site's integrated mitigating strategies and SFP instrumentation compliance program. This discussion should address the individual components of the plans, as well as the integrated implementation of the strategies including a timeline. The licensee team presenting this should include necessary representatives from site management, engineering, training, and operations that were responsible for program development, and will be responsible for training and execution.

Following the tabletop discussion, please be prepared to conduct walk-throughs of procedures and demonstrations of equipment as deemed necessary by NRC audit team members. Include representatives from engineering and operations that will be responsible for training and execution. At this time we expect, at a minimum, to walk-through the items below. Based on the tabletop presentations and audit activities, this list may change.

WALK-THROUGH LIST:

1. Walk-through a sample of strategies that will be delineated by specific NRC technical staff audit team members

2. Walk-through of portable (FLEX) diesel generator (DG) procedures, to include power supply pathways, areas where manual actions are required, and electrical isolation

3. Walk-through of building access procedures, to include any unique access control devices

4. Strategy walk-through of transfer routes from staging and storage areas to deployment locations for both onsite and offsite equipment

5. Strategy walk-through for core cooling and reactor coolant system (RCS) inventory, to include portable pumping equipment, flow paths, and water storage locations and the related reactor systems analysis and calculations

6. Walk-through of communications enhancements

7. Walk-through of SFP area, SFP instrumentation locations, and related equipment mounting areas

Part 2 – Specific Technical Review Items:

During the visit, the following audit items will be addressed from the licensee's ISEs (open items (OI), confirmatory items (CI), and SFPI RAIs); audit question list (AQ); licensee OIP, as supplemented, open items; and draft safety evaluation (SE) additional questions. Please provide documents or demonstrations as needed to respond to each item.

Audit Item Reference	Item Description
ISE OI 3.2.1.8.A	Core Sub-Criticality - The [Pressurized-Water Reactor Owners Group] PWROG submitted to NRC a position paper, dated August 15, 2013 (ADAMS Accession No. ML13235A135, non-public for proprietary reasons), which provides test data regarding boric acid mixing under single-phase natural circulation conditions and outlined applicability conditions intended to ensure that boric acid addition and mixing would occur under conditions similar to those for which boric acid mixing data is available. During the audit process, the licensee informed the NRC staff of its intent to abide by the generic approach discussed above. The licensee should address the clarifications in the NRC endorsement letter dated January 8, 2014 (ADAMS Accession No. ML13276A183).

Audit Item Reference	Item Description
ISE OI 3.2.4.7.A	Water Sources - The licensee appears to use a probability approach to reach a conclusion that at least one of the three tanks depended on for [steam generator] (SG) makeup will survive an [Extended loss of alternating current (ac) power] (ELAP) event. NEI 12-06 guidance does not give probability as an option. The licensee should determine if a water supply would be available after a tornado event by analyzing the tornado characteristics for the site compared to the separation characteristics of the tanks. This is an alternate approach from the strategies identified in NEI 12-06.
ISE CI 3.1.1.1.A	Protection of FLEX Equipment including FLEX diesel generators (DGs) - The licensee needs to finalize its evaluation of the use of the SGS auxiliary building and the use of the Hope Creek Generating Station, Unit 2 reactor building for permanent FLEX equipment storage.
ISE CI 3.1.1.2.A	Deployment of FLEX Equipment – The licensee should complete a review of deployment routes between the proposed equipment storage locations and the areas the equipment will be moved to and evaluate the potential for soil liquefaction.
ISE CI 3.1.1.3.B	Procedural Interfaces – Seismic Hazard - The licensee's integrated plan did not provide any information on: 1) non-robust internal flooding sources that do not require ac power; 2) the use of ac power to mitigate ground water in critical locations
ISE CI 3.1.1.4.A	Considerations in Using Offsite Resources – Seismic Hazard - Flooding Hazard - High Winds Hazard - Snow, Ice and Extreme Cold Hazard - Equipment staging areas for deployment of offsite equipment from SAFER will be finalized in a future 6 month update. Provide information on deployment of SAFER equipment.
ISE CI 3.1.2.2.A	Deployment of FLEX Equipment – Flooding Hazard - Finalization of proposed changes to the deployment of FLEX equipment during a hurricane induced flooding condition will be provided in a future 6 month update.
ISE CI 3.1.4.2.B	The licensee should address manual operations required by plant personnel during periods of snow, ice, and extreme cold hazards.
ISE CI 3.1.5.2.A	The licensee should confirm that there is no need for backup ventilation with respect to protection of FLEX equipment during high temperature hazards and what the impacts of high temperature hazards would be on the deployment of the FLEX equipment in such conditions.
ISE CI 3.1.5.3.A	The licensee should specify the peak temperature for which FLEX equipment would be expected to operate.
ISE CI 3.2.1.A	The licensee should specify which analysis performed in WCAP-17601-P is applicable to SGS and justify the use of that analysis by identifying and evaluating the important parameters and assumptions demonstrating that they are representative of SGS and appropriate for simulating the ELAP transient.
ISE CI 3.2.1.1.A	Analysis - Reliance on the NOTRUMP code for the ELAP analysis of Westinghouse plants is limited to the flow conditions prior to reflux condensation initiation. Verify that the code is not used beyond these flow conditions. This includes specifying an acceptable definition for the onset of reflux condensation cooling.
ISE CI 3.2.1.1.B	The licensee utilized the existing analyses in WCAP-17601-P, Revision 0, to develop its sequence of events and time constraints. The licensee will validate the response times at a future time. Discuss activities to validate the sequence of events.

Audit Item Reference	Item Description
ISE CI 3.2.1.2.A	Reactor Coolant Pump [RCP] Seal Leakage Rates - Confirm that the RCP seal initial maximum leakage rate used in the analysis is greater than or equal to the upper bound expectation for the ELAP event (21 gpm/seal) discussed in the PWROG white paper addressing the RCP seal leakage for Westinghouse plants.
ISE CI 3.2.1.2.B	Reactor Coolant Pump Seal Leakage Rates - In some plant designs, such as those with 1200 to 1300 psia SG design pressures and no accumulator backing of the main steam system power-operated relief valve actuators, the cold legs could experience temperatures as high as 580 °F before cooldown commences. This is beyond the 550 °F qualification temperature of the O-rings used in the RCP seals. For those Westinghouse designs, a discussion of the information (including the applicable analysis and relevant seal leakage testing data) should be provided to justify that (1) the integrity of the associated O-rings will be maintained at the temperature conditions experienced during the ELAP event, and (2) the seal leakage rate of 21 gpm/seal used in the ELAP is adequate and acceptable.
ISE CI 3.2.1.5.A	Monitoring Instrumentation and Controls - The review identified a concern with the level of accuracy of the FLEX instrumentation to ensure that electrical equipment remains protected (from an electrical standpoint – e.g., power fluctuations) and with the ability of this instrumentation to provide operators with accurate information ensure the maintenance of core cooling, containment, and spent fuel cooling. The licensee should confirm the accuracy of portable equipment instrumentation as it relates to equipment protection and operator information for maintenance of FLEX strategies.
ISE CI 3.2.1.6.A	Sequence of Events – During the NRC audit process the licensee summarized the changes in its mitigation strategies for Phase 1 and Phase 2. The evaluation for implementing these changes will be communicated in a future 6 month update. Discuss the evaluations for the current mitigation strategies.
ISE CI 3.2.1.9.A	Use of Portable Pumps – The Integrated Plan provides a Table depicting the FLEX equipment to be deployed and states that the quantity does not reflect the NEI 12-06 spare capability (N+1) guidance. The licensee should specify how many pieces of equipment will be available for an ELAP/Loss of ultimate heat sink (UHS), and this should meet N+1 requirements unless an alternative approach is proposed.
ISE CI 3.2.2.A	Spent Fuel Pool Cooling Strategies - In the audit and review, the licensee provided additional information regarding the SFP makeup during an ELAP event. It stated that a new 4" FLEX hose is being evaluated as replacement for SFP makeup. This connection would be upstream 1(2)SF 9 and would allow water from [Service Water] SW, [Auxiliary Feedwater] (AFW), and the FLEX boron mixing tank pump discharges to be aligned for SFP makeup. The proposed connection point is in the Auxiliary Building in the SFP pump area. Additionally, a spray pipe system is being re-evaluated. The licensee should provide details of the final configuration, including flow rates, and this information should be included in a 6 month update.
ISE CI 3.2.1.7.A	Cold Shutdown and Refueling - Confirm licensee will follow NEI's position paper and the NRC endorsement letter (ADAMS Accession No. ML13267A382).

Audit Item Reference	Item Description
ISE CI 3.2.4.2.A	Ventilation – Equipment Cooling - The licensee has provided insufficient details of the ventilation provided in the battery room to support a conclusion that there is reasonable assurance 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 elevated or lowered temperatures.
ISE CI 3.2.4.2.B	Ventilation – Equipment Cooling - The licensee provided a discussion on how hydrogen concentration in the battery rooms will be mitigated when the batteries are being recharged during Phases 2 and 3. The licensee will provide strategies to repower installed battery room exhaust fans or portable fans for ventilation.
ISE CI 3.2.4.4.A	Communications – Confirm that upgrades to the site's communication systems have been completed.
ISE CI 3.2.4.6.B	Personnel Habitability - The licensee stated that formal analyses would be performed to support the initial actions taken to provide cooling for the main control room (MCR) until Phase 2 actions can be implemented. The results of the modeling and analyses will be communicated in a future 6 month update.
ISE CI 3.2.4.8.A	Electrical Power Sources/Isolations and Interactions - licensee stated that diesel generator sizing calculations are in progress. The results will be communicated in a future six-month update. Provide information on generator sizing.
ISE CI 3.2.4.8.B	Electrical Power Sources/Isolations and Interactions - The licensee discussed use of electrical equipment such as 480 VAC DG Power Distribution, 480 VAC "A" Vital Bus, 230 VAC Power supplies to instruments, associated cablings and connectors. Confirm that electrical isolation will be maintained such that (a) Class 1E equipment is protected from faults in portable/FLEX electrical equipment and (b) multiple sources do not attempt to power electrical buses.
ISE CI 3.2.4.8.C	Electrical Power Sources/Isolations and Interactions – Confirm the analyses address the minimum voltage that must be maintained on the dc buses and its basis.
ISE CI 3.2.4.9.A	Portable Equipment Fuel – Confirm that sufficient fuel is available considering the fuel consumption rate for each FLEX piece of equipment.
ISE CI 3.2.4.10.A	The battery sizing calculation needs to be verified when revised to show that dc power for 2 of 4 channels can be maintained for 24 hours without a charger in place.
ISE CI 3.2.4.10.B	Load Reduction to Conserve DC Power - The licensee should describe the results of the final battery load shed analyses, including which functions are lost, plant components that will change state, and the effects of components changing state.
ISE 3.3.2.A	Configuration Control - The licensee should provide the single line diagrams of the proposed electrical systems.
AQ 2	Storage of portable equipment: NEI 12-06, Sections 5.3.1 and 11.3 provide programmatic requirements for stored FLEX equipment. Provide discussion concerning the regular maintenance, replacement of existing equipment, periodic testing, and drills planned for the stored equipment.

Audit Item Reference	Item Description
AQ 10	Accessibility. NEI 12-06, Section 3.2.2, guideline (8) states the requirements for the development of guidance and strategies with regard to the access to the Protected Area and internal locked areas that may be inaccessible during an ELAP. Contrary to this, SGS did not provide detail on this topic. Provide a discussion describing how access to plant areas affected by loss of electrical power would be accessible regarding security doors and locks.
AQ 12	Training: NEI 12-06, Section 11.6, Training states the requirements for programmatic training for the personnel and organization required for the implementation of FLEX strategies. In its integrated plan, there was no mention of organizational changes, including emergency response organization that may be necessary to implement the FLEX strategy due to an ELAP. Provide detail on changes to the Emergency Response Organization, anticipated considering the complexity of deploying FLEX equipment. Include a discussion concerning interactions with Hope Creek Generating Station.
AQ 13	Completion of the flood and seismic hazard re-evaluations pursuant to the 10 CFR 50.54(f) letter of March 12, 2012 are not completed and therefore not assumed in this submittal. Because the results of the re-evaluation affect multiple strategies later discussed in the licensee's integrated plan, this remains an open item.
AQ 14	Procedural interface considerations (seismic). Review of the licensee's approach with regard to the use of portable instruments to obtain necessary instrument readings as described above does not provide sufficient information to conclude that there is reasonable assurance that this aspect of NEI 12-06, Section 5.3.3, consideration 1 will be met because: Reference source for the operators for obtaining necessary instrument readings to support implementation of the coping strategy is needed for both control room and non-control room readouts and how and where to measure key readings at containment penetrations (where applicable) using a portable instrument; Guidance should include critical actions to perform until alternate indications can be connected (measured) [an example would be – guidance on what the operator should do if SG pressure indication was lost during the time you are connecting a portable instrument to read SG pressure]; and Guidance should include instructions on how to control critical equipment without control power. [an example would be controlling the Turbine-driven auxiliary feedwater (TDAFW) pump without control power]
AQ 16	Configuration control. The licensee's plan for configuration control does not address the guidance of NEI 12-06, Section 11.8, items 1, 2, & 3. Discuss the process for configuration control of the FLEX strategies, including (1) maintenance of the basis for the strategies, (2) how the strategies will be updated to reflect future changes in the plant, and (3) criteria for NRC review of changes to the strategies.
AQ 17	The licensee indicates maximum environmental room temperatures for habitability or equipment availability are based on NUMARC 87-00. The NUMARC 87-00 room heat-up evaluation methodology is based on a 4-hour coping time. The licensee is requested to provide maximum environmental room temperatures at ELAP coping periods greater than the 4-hours assumed in NUMARC 87-00.

Audit Item Reference	Item Description
AQ 27	Fuel for portable equipment. On page 46 of 56, the licensee's plan describes repowering the diesel fuel oil transfer system or pumps. Explain how fuel quality will be assured if stored for extended periods of time.
AQ-29	Decay Heat Curve. The licensee's integrated plan provided insufficient detail to provide reasonable assurance that the plan conforms to NEI 12-06 with regards to the thermal hydraulic analyses developed to support plant- specific decision-making and the justification for the duration of each phase. Specifically, assumption 4 on page 4-13 of WCAP-17601 states that, "Decay heat is per ANS 5.1-1979 + 2 sigma, or equivalent." Address the applicability of assumption 4 to Salem. If the ANS 5.1-1979 + 2 sigma model is used in the ELAP analysis, address the adequacy of the use of the decay heat model in terms of the plant-specific values of the following key parameters: (1) initial power level, (2) fuel enrichment, (3) fuel burnup, (4) effective full power operating days per fuel cycle, (5) number of fuel cycles, if hybrid fuels are used in the core, and (6) fuel characteristics (addressing whether they are based on the beginning of the cycle, middle of the cycle, or end of the cycle). If a different decay heat model is used, describe the specific model and address the adequacy of the model and the analytical results.
AQ-30	On page 2 of the licensee's submittal, the licensee states that a hurricane event is assumed to have greater than 48 hours of warning time and flooding is expected to persist on the site for approximately 12 hours, and that the warning time is sufficient to pre-stage FLEX equipment as described in the FLEX strategies presented later in the Integrated Plan. The staff requests that the licensee provide information on how the pre-staged equipment will be protected from the high winds of the hurricane.
AQ-33	On page 23 of the licensee's submittal, the licensee states that if required, the boric acid transfer pumps or a small FLEX boric acid transfer pump can be used to transfer this inventory to the suction of the charging pump or FLEX charging pump using installed piping. However, the licensee does not list a small FLEX boric acid transfer pump in the table of Phase 2 equipment on page 49. The staff requests that the licensee provide information on the use of a FLEX boric acid pump, including required flow rate/capacity, motive force for the pump, and how and where pump will be used to transfer borated water to the suction of the charging pumps.

Audit Item Reference	Item Description
AQ-34	On page 23 of the licensee's submittal, the licensee states that in the event of a hurricane and for long-term borated water preparation, a temporary trailer mounted mixing tank with a positive displacement pump and heater will be moved to the flood protected truck bay in the auxiliary building. However, the licensee does not list such a mixing tank in the table of Phase 2 equipment on page 49. The staff requests that the licensee provide the following information regarding the mixing tank: • Is the tank part of the site FLEX equipment inventory? If so, where will the licensee store the tank? • If not, what how does the licensee plan to store and maintain the mixing tank and associated truck in order to conform to the storage and maintenance guidance in NEI 12-06? • What is the source of water/boron for the mixing tank?
AQ-35	In Section 5.2 of the licensee's submittal, the licensee states that the motor driven AFW FLEX pump located in the auxiliary building, as described in Section 2.2, could be aligned to provide makeup to the SFP through the piping configurations discussed in Section 2.2. Section 2.2 of the license's submittal states that the FLEX AFW pump discharge is connected with hose to a permanent connection point downstream of the TDAFW pump discharge check valve and to the SFP as discussed in Section 5.2. As seen each section merely references the other section and neither section provides a written description of how the AFW FLEX pump will connect to the SFP to provide make-up water. The staff requests that the licensee provide a description of how the AFW FLEX pump will connect to the SFP to provide make-up water.
AQ-36	On page 33 of the licensee's submittal, the licensee states that the required make-up for the SFP is 100 gpm. On page 16 of the licensee's submittal, the licensee states that the required flow for SG injection is 300 gpm. According to drawing 1M-6, the FLEX AFW is the only flex method capable of injecting to the SG and make-up to the SFP, which would require 400 gpm. However, in the table on page 49 of the submittal, the FLEX AFW pump is rated to 350 gpm. The staff requests that the licensee provide a strategy using portable FLEX equipment with enough capacity to address simultaneously challenges to core cooling, containment, and SFP cooling capabilities.
AQ-38	Section 7.2 of the licensee's submittal cites the use of portable fans for ventilation in different areas of the plant. However, the table of portable equipment on page 49 does not list any fans. The staff requests that the licensee provide information regarding the quantity and size (electrical consumption) of the fans used for ventilation as well as any environmental qualification.

Audit Item Reference	Item Description
AQ-40	On Page 23 of the licensee's submittal, the licensee describes their strategy for Phase 2 RCS inventory control. The licensee's primary strategy relies on the RWST, which is not designed to be robust with respect to all design basis external events. NEI 12-06 explicitly states that installed equipment that is designed to be robust with respect to design basis external events is assumed to be available and that installed equipment that is not robust is assumed to be unavailable. The staff requests that the licensee provide a Phase 2 strategy for RCS inventory control that relies only on installed equipment that is robust as defined in NEI 12-06, portable FLEX equipment that is protected as outlined in NEI 12-06, or a combination thereof.
SFPI RAI 2	Please provide additional information describing how the proposed arrangement of the SFP instrumentation and routing of the cabling between the level instruments, the electronics, and the displays in the MCR meets the order requirement to arrange the SFP level instrument channels in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the SFP.
SFPI RAI 3	Please provide the following: a) The design criteria that will be used to estimate the total loading on the mounting device(s), including static weight loads and dynamic loads. Describe the methodology that will be used to estimate the total loading, inclusive of design basis maximum seismic loads and the hydrodynamic loads that could result from pool sloshing or other effects that could accompany such seismic forces. b) A description of the manner in which the level sensor (and stilling well, if appropriate) will be attached to the refueling floor and/or other support structures for each planned point of attachment of the probe assembly. Indicate in a schematic the portions of the level sensor that will serve as points of attachment for mechanical/mounting or electrical connections. c) A description of the manner by which the mechanical connections will attach the level instrument to permanent SFP structures so as to support the level sensor assembly
SFPI RAI 11	Please provide the NRC staff with the final configuration of the power supply source for each channel so that the staff may conclude that the two channels are independent from a power supply assignment perspective.
SFPI RAI 16	Please provide the following: a) The specific location for the primary and backup instrument channel display. b) Please describe the evaluation used to validate that the display location can be accessed without unreasonable delay following a BDB event. Include the time available for personnel to access the display as credited in the evaluation, as well as the actual time (e.g., based on walk-throughs) that it will take for personnel to access the display. Additionally, please include a description of the radiological and environmental conditions on the paths personnel might take. Describe whether the display location remains habitable for radiological, heat and humidity, and other environmental conditions following a BDB event. Describe whether personnel are continuously stationed at the display or monitor the display periodically.
SFPI RAI 20	Explain how susceptibility to electromagnetic interference is being addressed.

Audit Item Reference	Item Description
SE #1	1. (RCS Venting) The generic analysis in WCAP-17601-P strictly addressed ELAP coping time without consideration of the actions directed by a site's mitigating strategies. WCAP-17792-P extends these analytical results through explicit consideration of mitigating strategies involving RCS makeup and boration. In support of the RCS makeup and boration strategies proposed therein, a generic recommendation is made that Pressurized-Water Reactors vent the RCS while makeup is being provided. Please provide the following information in regard to this topic: a. Will the mitigating strategy include venting of the RCS? b. If so, please provide the following information: i. The vent path to be used and the means for its opening and closure. ii. The criteria for opening the vent path. iii. The criteria for closing the vent path. iv. Clarification as to whether the vent path could experience two-phase or single-phase liquid flow during an ELAP. If two-phase or liquid flow is a possibility, please clarify whether the vent path is designed to ensure isolation capability after relieving two-phase or liquid flow. v. If relief of two-phase or liquid flow is to be avoided, please discuss the availability of instrumentation or other means that would ensure that the vent path is isolated prior to departing from single-phase steam flow. vi. If a pressurizer PORV is to be used for RCS venting, please clarify whether the associated block valve would be available (or the timeline by which it could be repowered) in the case that the PORV were to stick open. If applicable, please further explain why opening the pressurizer PORV is justified under ELAP conditions if the associated block valve would not be available. vii. If a pressurizer PORV is to be used for RCS venting, please clarify whether FLEX RCS makeup pumps and FLEX steam generator makeup pumps will both be available prior to opening the PORV. If they will not both be available, please provide justification. c. If RCS venting will not be used, please provide the following information: i. The expected RCS temperature and pressure after the necessary quantity of borated makeup has been added to an unvented RCS. ii. Adequate justification that the potential impacts of unvented makeup will not adversely affect the proposed mitigating strategy (e.g., FLEX pump discharge pressures will not be challenged, plant will not reach water solid condition, adequate boric acid can be injected, increased RCS leakage will not adversely affect the integrated plan timeline, etc.).

Audit Item Reference	Item Description
SE #2	(Westinghouse Standard RCP Seals: NSAL-14-1): On February 10, 2014, Westinghouse issued Nuclear Safety Advisory Letter (NSAL)-14-1, informing licensees of plants with standard Westinghouse RCP seals that 21 gpm may not be a conservative leakage rate for ELAP analysis. This value had been previously used in the ELAP analysis referenced by many Westinghouse Pressurized-Water Reactors, including the generic reference analysis in WCAP-17601-P. Therefore, please clarify whether the assumption of 21 gpm of seal leakage per RCP (at 550 degrees F, 2250 psia) remains valid in light of the issues identified in NSAL-14-1. In so doing, please identify the specifics of the seal leak off line design and #1 seal faceplate material relative to the categories in NSAL-14-1 and identify the corresponding presumed leakage rate from NSAL-14-1 that is deemed applicable.
SE #3	(RVLIS Availability) Technical report WCAP-17792-P makes recommendations regarding the timing for providing RCS makeup based on level indications in the reactor vessel. However, these systems were not included as recommended instrumentation in NEI 12-06 and, hence, did not typically appear in licensee's integrated plans. Please clarify whether a system such as the reactor vessel level instrumentation system (RVLIS) or reactor vessel level measurement system (RVLMS) will be available during an ELAP event. If such a system will not be available, please provide clarification as to how reactor operators will determine when to provide RCS makeup and provide justification for the intended strategy.
SE #4	(Timeline to reflux cooling) Please clarify whether the intended timeline for aligning the FLEX RCS makeup pump may be delayed based on procedural guidance that derives from the analysis in WCAP-17792-P, pages 3-10 through 3-16. Although the staff recognizes that plant operators require leeway to control pumps and equipment in response to plant indications and other symptoms, the staff considers it prudent that equipment alignments proceed as outlined in the integrated plan to the extent possible. Therefore, please provide justification if the operators would delay the alignment of the FLEX RCS makeup pump(s) beyond the time specified in the integrated plan based on initial indications that the reactor coolant pump seal leakage is lower than the value assumed in the ELAP analysis.
SE #5	Please provide adequate basis that calculations performed with the NOTRUMP code (e.g., those in WCAP-17601-P, WCAP-17792-P) are adequate to demonstrate that criteria associated with the analysis of an ELAP event (e.g., avoidance of reflux cooling, promotion of boric acid mixing) are satisfied. NRC staff confirmatory analysis suggests that the need for implementing certain mitigating strategies for providing core cooling and adequate shutdown margin may occur sooner than predicted in NOTRUMP simulations.

Part 3 – Specific Topics for Discussion:

1. Draft of Salem OPD/FIP
2. Reactor systems analyses to include a discussion of applicability to WCAP-17601-P, boron mixing, WCAP-17792-P, and Nuclear Safety Advisory Letter (NSAL) 14-1
3. Training
4. Portable (FLEX) equipment maintenance and testing
5. RRC (SAFER) Response Plan

Proposed Schedule

Onsite Day 1, Tuesday, August 5, 2014

0800 Check in at site; Badging

0930 Entrance meeting

0945 Licensee presentation of strategies

1230 Lunch

1330 NRC Audit Team Activities:

- Technical area break-out discussions between NRC and licensee staff in the areas of reactor systems, electrical, balance-of-plant/structures, SFPI, and others
- Review documents relating to open or confirmatory items, RAIs, codes, analyses, etc.

1600 NRC Audit Team meeting

1630 Team lead daily debrief/next day planning with licensee

Onsite Day 2, Wednesday, August 6, 2014

0800 Check in at site; meet with Senior Resident/Resident

0830 Dosimetry and whole body count for RCA entrance

0900 NRC Mitigating Strategies/SFPI walk-throughs with licensee:

1200 Lunch

1300 Continue NRC Audit Team Activities

1600 NRC Audit Team meeting

1630 Team lead daily debrief/next day planning with licensee

Onsite Day 3, Thursday, August 7, 2014

0800 Continue NRC Audit Team Activities

1200 Lunch

1300 Continue NRC Audit Team Activities

1330 NRC Audit Team meeting

1430 NRC/Licensee pre-exit meeting

1530 NRC/Licensee exit meeting

1600 Audit closeout/departure

The NRC staff's review led to the issuance of the Salem ISE and RAI dated October 17, 2013 (ADAMS Accession No. ML13270A414). By letter dated March 26, 2014 (ADAMS Accession No. ML14083A620), the NRC notified all licensees and construction permit holders that the staff is conducting in-office and onsite audits of their responses to Order EA-12-051 in accordance with NRC NRR Office Instruction LIC-111 as discussed above.

The ongoing audit process, to include the in-office and onsite portions, allows the staff to assess whether it has enough information to make a safety evaluation of the Integrated Plans. The audit allows the staff to review open and confirmatory items from the mitigation strategies ISE, RAI responses from the spent fuel pool instrumentation ISE, the licensee's integrated plans, and other audit questions. Additionally, the staff gains a better understanding of submitted information, identifies additional information necessary for the licensee to supplement its plan, and identifies any staff potential concerns. The audit's onsite portion will occur prior to declarations of compliance for the first unit at each site.

This document outlines the on-site audit process that occurs after ISE issuance as licensees provide new or updated information via periodic updates, update audit information on e-portals, provide preliminary Overall Program Documents/Final Integrated Plans, and continue in-office audit communications with staff while proceeding towards compliance with the orders.

The staff plans to conduct an onsite audit at Salem in accordance with the enclosed audit plan from August 5-7, 2014.

If you have any questions, please contact me at 301-415-2901 or by e-mail at john.boska@nrc.gov.

Sincerely,
/RA/
John Boska, Senior Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos.: 50-272 and 50-311
Enclosure:
Audit plan
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OFFICE	NRR/DIRS/IPAB/AET*	NRR/JLD/LA	NRR/JLD/JCBB/BC*	NRR/JLD/JERB/BC*
NAME	DAllsopp	SLent	SBailey	SWhaley
DATE	07/07/14	07/02/14	07/11/14	07/10/14
OFFICE	NRR/JLD/JOMB/BC*	NRR/JLD/JOMB/PM		
NAME	JBowen	JBoska		
DATE	07/08/14	07/11/14		

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