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

November 6, 2014

Mr. Joseph W. Shea
Vice President, Nuclear Licensing
Tennessee Valley Authority
1101 Market Street LP 3D-C
Chattanooga, TN 37402

SUBJECT: SEQUOYAH NUCLEAR PLANT, UNITS 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. MF0864, MF0865, MF0794, AND MF0795)

Dear Mr. Shea:

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. ML13063A183), Tennessee Valley Authority (TVA, the licensee) submitted its OIP for Sequoyah Nuclear Plant, Units 1 and 2 (Sequoyah) in response to Order EA-12-049. By letters dated August 28, 2013, February 28, 2014, and August 28, 2014 (ADAMS Accession Nos. ML13247A286, ML14064A295, and ML14247A644, respectively), TVA submitted its first three 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) Office Instruction LIC-111, "Regulatory Audits" (ADAMS Accession No. ML082900195). This audit process led to the issuance of the Sequoyah interim staff evaluation (ISE) and audit report (ADAMS Accession No. ML14002A109) and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13063A011), the licensee submitted its OIP for Sequoyah in response to Order EA-12-051. By letter dated July 17, 2013 (ADAMS Accession No. ML13198A354), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated August 16, 2013, August 28, 2013, February 28, 2014, and August 28, 2014 (ADAMS Accession Nos. ML13235A007, ML13247A291, ML14064A181, and ML14248A478, respectively), the licensee submitted its RAI responses and first three six-month updates to the OIP.

The NRC staff's review led to the issuance of the Sequoyah ISE and RAI dated November 21, 2013 (ADAMS Accession No. ML13312A415). 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 Sequoyah in accordance with the enclosed audit plan from December 1-5, 2014.

If you have any questions, please contact me at 301-415-1924 or by e-mail at tony.brown@nrc.gov.

Sincerely,

Tony Brown, Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos.: 50-327 and 50-328

Enclosure:
Audit plan

cc w/encl: Distribution via Listserv

Audit Plan
Sequoyah Nuclear Plant, Units 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 their Overall Integrated Plans (OIPs) including descriptions of how compliance with the requirements of Attachment 2 of each order will be achieved.

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By letter dated February 28, 2013 (ADAMS Accession No. ML13063A011), the licensee submitted its OIP for Sequoyah in response to Order EA-12-051. By letter dated July 17, 2013 (ADAMS Accession No. ML13198A354), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated August 16, 2013, August 28, 2013, February 28, 2014, and August 28, 2014 (ADAMS Accession Nos. ML13235A007, ML13247A291, ML14064A181, and ML14248A478, respectively), the licensee submitted its RAI responses and first three 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 Japan Lessons-Learned Project Directorate (JLD) 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 Sequoyah 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 staging 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 National SAFER Response Center (NSRC) 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 and Project Manager	Tony Brown
Technical Support	Garry Armstrong
Technical Support	Josh Miller
Technical Support	Prem Sahay
Technical Support	Stephen Wyman

LOGISTICS

The audit will be conducted onsite at Sequoyah on December 1-5, 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 90 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, NSRC (SAFER) Sequoyah 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 staging of select portions; 2) a review of material relating to open or confirmatory items and RAIs from the ISEs, staff audit questions, and licensee-identified 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 and/or pre-staged (FLEX) diesel generator (DG) strategies/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 portable equipment

5. Strategy walk-through for core cooling and reactor coolant system (RCS) inventory, to include portable pumping equipment, flow paths, and water sources 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

8. Walk-through of procedure FSG-4 for load shed, with an operator who would perform this procedure during an event demonstrating the steps needed to perform the load shed.

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 - Complete the reanalysis to support the revised core boration coping strategy of providing boration early in the [extended loss of alternating current (ac) Power] ELAP event including the deployment considerations and the rate of boration as it affects sizing the high pressure (HP) FLEX pump is to be completed.

Audit Item Reference	Item Description
ISE OI 3.2.4.8.A	Electric Power Sources- On page E-57 of the Integrated Plan, the licensee stated plans to pre-stage and protect two 225 kVA 480 volt FLEX diesel generators on the roof of the Auxiliary Building and two 3 MW 6.9 kV FLEX diesel generators in the protected Flexible Equipment Storage Building (FESB). The use of pre-staged 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.
ISE CI 3.1.1.2.A	Deployment of FLEX Equipment - Confirm the routes from offsite staging areas "C" and "D" are not subject to liquefaction.
ISE CI 3.1.1.2.B	Deployment of FLEX Equipment - Confirm that loss of ac power will not prevent moving or deploying portable equipment.
ISE CI 3.1.2.2.A	Deployment Flood Hazard - Confirm the ability to use the HP electric, submersible FLEX pump for coping during the flood mode considering the following FLEX equipment deployment considerations: a) its stored location, b) method of deployment, c) staged location, and d) method of connecting and powering up the HP pump.
ISE CI 3.1.3.2.A	Deployment High Winds - Confirm that the licensee's preparations for the hurricane hazard address the impact on the ultimate heat sink (UHS).
ISE CI 3.1.4.1.A	Protection of 225 kVA DGs- Extreme cold temperature hazard. Confirm the licensee has addressed the need for heating of the enclosure housing the FLEX DGs on the roof of the auxiliary building.
ISE CI 3.1.5.1.A	Protection of 225 kVA DGs- High temperature hazard. Confirm the licensee has addressed the need for ventilation/cooling the enclosure housing the FLEX DGs on the roof of the auxiliary building.
ISE CI 3.2.1.1.A	ELAP Analysis - Confirm the licensee's reliance on the NOTRUMP code for the ELAP analysis of Westinghouse plants is limited to the flow conditions prior to reflux condensation initiation. This includes specifying an acceptable definition for reflux condensation cooling.
ISE CI 3.2.1.2.A	RCP Seals- Complete the analysis for [reactor coolant pump] RCP seal leakage rates and confirm its use in the ELAP analysis and the justification for the value used in the Sequoyah RCS make-up calculation.

Audit Item Reference	Item Description
ISE CI 3.2.1.2.B	RCP Seals - Confirm integrity of 0-rings if the cold leg temperature exceeds 550 degrees °F during the ELAP event. The applicable analysis and relevant seal leakage testing data used to justify that the integrity of the associated 0-rings will be maintained at the temperature conditions experienced during the ELAP event needs to be evaluated in the context of the Sequoyah updated strategy.
ISE CI 3.2.1.3.A	Decay Heat - Confirm the applicability of assumption 4 on page 4-13 of WCAP-17601-P, which states that "Decay heat is per ANS 5.1-1979 + 2 sigma, or equivalent." If the ANS 5.1-1979 +2 sigma model is used in the ELAP analysis, values of the following key parameters used to determine the decay heat should be specified and the adequacy of the values used: (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 are based on the beginning of the cycle, middle of the cycle, or end of the cycle.
ISE CI 3.2.1.8.B	Core Sub Criticality - Confirm the analytical model addresses the boron mixing model under natural circulation conditions potentially involving two-phase flow, is in accordance with the Pressurized-Water Reactor Owners Group (PWROG) position paper, dated August 15, 2013 (ADAMS Accession No. ML13235A135 (non-public for proprietary reasons)) to include the three additional considerations provided in the NRC endorsement letter dated January 8, 2014 (ADAMS Accession No. ML13276A183).
ISE CI 3.2.4.1.A	Equipment Cooling - Confirm that the SFP cooling system pumps, component cooling system pumps, motor driven [auxiliary feedwater] AFW pumps and the air compressors are sufficiently cooled to function for their expected duration during the ELAP event.
ISE CI 3.2.4.2.A	Ventilation- Confirm that the equipment in the safety injection pump room, MDAFW pump room and CC pump room are capable of operating in the post ELAP environmental temperatures for their required duration once analyses to determine the temperature rise are complete.
ISE CI 3.2.4.2.B	Ventilation - Confirm the impacts of extreme high or low temperatures and any accompanying mitigation methodologies due to a loss of ventilation and/or cooling on electrical equipment being credited as part of the ELAP strategies (e.g., electrical equipment such as in the turbine-driven auxiliary feedwater (TDAFW) pump room) are acceptable.
ISE CI 3.2.4.2.C	Ventilation - Discuss battery room ventilation to prevent hydrogen accumulation while battery recharging during Phase 2 or 3. Confirm that the hydrogen concentration in the battery room will remain less than combustibility limits in the context of the licensee's strategies for the ELAP event. In your response, include a description of the battery room exhaust path if it is different from the design-basis.

Audit Item Reference	Item Description
ISE CI 3.2.4.3.A	Heat Tracing - Confirm that the licensee has addressed the possibility of boric acid precipitation after loss of heat tracing during extreme cold conditions. The evaluation should consider the time boration is initiated and throughout the time of boration.
ISE CI 3.2.4.4.A	Communication - Confirm that upgrades to the site's communications systems have been completed in accordance with TVAs Communications Assessment and as evaluated by the NRC staff (ADAMS Accession No. ML13116A125).
ISE CI 3.2.4.5.A	Accessibility- Confirm the ability to access protected and internal locked areas.
ISE CI 3.2.4.6.A	Personnel Habitability - Confirm that there are no habitability/accessibility concerns for the areas where local operator actions are performed to include completion of the habitability/accessibility study and any accompanying mitigation actions.
ISE CI 3.2.4.8.B	Electrical Power Sources - The sizing basis for the Phase 2 and 3 FLEX DGs and their ability to start the planned individual loads identified in the FLEX strategies. Confirm that the analysis for sizing of the DG shows that it encompasses coordination for protective equipment, cable ampacity, and voltage drop.
ISE CI 3.2.4.10.A	Open Item 3.2.4.10.A - Load Reduction - Confirm that the licensee has addressed the actions necessary to complete the load shed, including the equipment location (or location where the required action needs to be taken), the time to complete each action, and identify which functions are lost as a result of shedding each load.
ISE CI 3.4.A	Off-Site Resources - Confirm the licensee's arrangements for off-site resources addresses the guidance of Guidelines 2 through 10 in NEI 12-06, Section 12.2.
AQ 4	In its integrated plan, TVA has provided information regarding its use of the offsite resources through the industry Strategic Alliance for FLEX Emergency Response (SAFER) program, but has not yet identified the local staging area and methods of transportation to be used to deliver the equipment to the site considering the seismic, flooding, high wind, and extreme cold hazards. Identify location of the new FLEX equipment storage building, local staging areas and methods of transportation to these areas to demonstrate consistency with the guidance of NEI 12-06, Section 5.3.4, consideration 1; Section 6.2.3.4, considerations 1 and 2; Section 7.3.4, considerations 1 and 2; and Section 8.3.4.
AQ 9	NEI 12-06, Section 9.3.2, addresses the ability of the portable equipment to operate in conditions of high environmental temperatures. Provide information related to the design and procurement of the FLEX equipment regarding the ability of the equipment to operate in a high temperature environment, especially equipment that is staged indoors where ventilation has failed due to loss of ac power.

Audit Item Reference	Item Description
AQ 10	Review of the licensee's plan regarding the use of the Watts Bar analysis and by inference the generic thermal hydraulic analyses contained in "Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering and Babcock & Wilcox NSSS Designs, "WCAP 17601, Revision 1, January 2013, (WCAP 17601) for identifying the time constraints associated with implementing the FLEX strategies, finds that the plan is not consistent with the guidance in NEI 12-06, Sections 1.3 and 3.2.1.7. 1) Specify which analysis performed in WCAP-17601 is being applied to your site. 2) Justify the use of that analysis by identifying and evaluating the important parameters and assumptions demonstrating that they are representative of your site and appropriate for simulating the ELAP transient. 3) Provide a detailed comparison of the Sequoyah plant specific parameters to the parameters used in WCAP 17601-P to demonstrate the applicability of those analyses to the plant-specific conditions at Sequoyah. 4) Address how and to what extent Sequoyah implemented the recommendations specifically applicable to Westinghouse designed plants listed in WCAP 17601-P, Section 3.1. (a) list the recommendations that are applicable to the plant, (b) provide technical basis for the applicability of these recommendations, (c) address how the applicable recommendations are considered in the ELAP coping analysis, (d) discuss the plan to implement the recommendations. 5) Provide a technical basis for each of the recommendations in WCAP 17601-P that are determined to be not applicable to the Sequoyah units.
AQ 14	NEI 12-06, Section 3.2.1.3 consideration 5 discusses the robustness of the onsite fuel storage and thus its availability to initially support the operation of FLEX equipment. NEI 12-06, Section 3.2.2 Consideration (13) discusses the fuel necessary to operate the FLEX equipment including the availability of sufficient quantities and delivery capabilities. Describe: 1) Describe the onsite fuel storage and how it would be used to support the operation of FLEX equipment. In addition, describe plans for supplying fuel oil to FLEX equipment (i.e., fuel oil storage tank volumes, supply pathway, transfer pumps, etc.). Also, explain how fuel quality will be assured if stored for extended periods of time. 2) Describe the robustness of the fuel storage with respect to seismic events, floods, and high winds and associated missiles. 3) The quantity of fuel that is expected to be initially available on site for fueling the FLEX portable pumps and generators. 4) The amount and frequency of refueling requirements for each portable pump and generator deployed. 5) The critical time need to access the 7 day tank supplies or resupply the 7 day tanks.

Audit Item Reference	Item Description
AQ 20	NEI 12-06, Table 3-2 requires that all plants provide means for borated RCS makeup. The coping strategy assumes boric acid tanks (BATs) are available during the initial stages of the flood mode since the ELAP is postulated in the Sequoyah plan to occur first with the maximum flood elevation occurring 24 hours after the ELAP. 1) Describe the method of boration to be used for the case where the ELAP occurs after the flood waters reach the Auxiliary Building and flood the BAT tanks rendering them unavailable. 2) Provide information related to how the licensee is notified of impending flood waters (e.g., by the Army Corps of Engineers). 3) Describe how existing plant flood protection procedures utilize the FSGs to cope with the case where the ELAP event occurs at any stage of a flood.
AQ 21	The licensee's plan regarding spent fuel pool cooling strategies is not consistent with the guidance of NEI 12-06, Table 3.2 and Appendix D-3 because no information is provided for the bounding heat load and required makeup flow rate during Phases 1 and 2. In the description for Phase 1, the time for the water to reach the 10 ft level above the spent fuel is stated in the implementation plan to be 29 hours, while in the description for Phase 2 under similar heat load conditions in the spent fuel pool the time is stated to be 37 hours. 1) Clarify this apparent inconsistency and 2) provide the heat loads in the spent fuel pool on which these times for boil off to reach 10 feet above the fuel are based.
AQ 27	NEI 12-06, Section 3.2.2 consideration (3) states that plant procedures/guidance should specify actions necessary to assure that equipment functionality can be maintained (including support systems or alternate method) in an ELAP/LUHS or can perform without ac power or normal access to the UHS. The licensee's plan regarding equipment cooling support function does not discuss whether the TDAFW pump requires cooling water for bearing cooling and whether the TDAFW pump can function for the required coping strategy duration. It is noted that the Sequence of Events (SOE) timeline and the coping strategy for reactor core cooling expect the TDAFW pump will operate continuously for 24 hours until the intermediate pressure FLEX pump is staged and put into operation. Provide a discussion as to whether the TDAFW pump has specific cooling needs (e.g., for the turbine lubrication oil) based on the way in which the TDAFW pump is used to support FLEX strategies.

Audit Item Reference	Item Description
AQ 32	NEI 12-06 Section 3.2.2 consideration (8) discusses that areas requiring access for instrumentation monitoring or equipment operation may require portable lighting as necessary to perform essential functions. Consideration (9) discusses access to protected and internal locked areas where remote equipment operation is necessary. The OIP lists portable lighting as Phase 3 support equipment, but does not address lighting in Phases 1 and 2. The OIP does not have any information on the means for accessing internal locked or protected areas under ELAP conditions. 1) Describe the means for providing interior and exterior lighting during Phases 1 and 2 to support the coping strategies. 2) Describe the means for accessing locked and protected areas under ELAP conditions.
AQ 41	Section 4.4.1 of WCAP-17601 states, in part, that, "The NRC Information Notice (IN) 2005-14 has accepted the use of a 21 gpm assumption in deterministic analyses to develop coping analyses to show compliance with Appendix R. Given that the 50.63 station blackout transient is similar with regard to seal performance, the 21 gpm should also be acceptable for developing ELAP strategies; this has not been called into question by the NRC in inspections (e.g., Component Design Basis Inspections)." It is stated in IN 2005-14 that, "For the Westinghouse RCP seals, as discussed in a recently submitted document on RCP seal performance, a leakage rate of 21 gpm per RCP may be assumed in the licensee's safe shutdown assessment following the loss of all RCP seal cooling. Assumed leakage rates greater than 21 gpm are only warranted if the increase seal leakage is postulated as a result of deviations from seal vendor recommendations." It is also stated in IN 2005-14 that, "Even if seal cooling is not reestablished, degradation of the seals for leakage rate to significantly increase is not expected for an indefinite period of time if the RCPs are secured before the seal temperature exceeds 235 degrees °F. Restoration of seal cooling may result in cold thermal shock of the seal and possibly cause increased seal leakage." Address the applicability of the above statements from IN 2005-14 to the ELAP analysis.

Audit Item Reference	Item Description
AQ 48	Sequoyah's integrated plan, maintain core cooling & heat removal section states: To provide an unlimited supply of water for core cooling during Phase 2, a low pressure FLEX pump will be used to pressurize the essential raw cooling water (ERCW) headers which can then be used for direct supply to the TDAFWP suction. However, the OIP doesn't state the suction source for the low-pressure FLEX pumps. In addition, Page E-21 through E-22 of the OIP discusses the primary connection for the intermediate pressure FLEX pump with SG available for Phase 2 of Maintain Core Cooling & Heat Removal will be located in the steam valve room upstream of the LCVs on the TDAFWP discharge piping. It states that during flood conditions the suction will be taken from the ERCW headers or a submersible pump supplying flood water. 1) Describe the suction source for the low-pressure FLEX pumps and discuss whether there are strainers or filters required to remove debris from this source? If so, explain how often it is expected that filter cleaning will need to be performed for this source. 2) Describe whether there is there any filtration to remove debris for this submersible pump that is supplying flood water? Is there any requirement/need to have the suction be filtered such that the submersible pump supplying flood water will continue to perform its function?
AQ 49	Sequoyah's integrated plan, maintain core cooling & heat removal section phase 2 states: An intermediate pressure FLEX pump will be provided for supplying water to the SGs for core cooling after operating conditions of the TDAFWP cannot be maintained. The intermediate pressure FLEX pump will supply water to the auxiliary feedwater piping downstream of the TDAFWP or motor-driven auxiliary feedwater pumps (MDAFWPs). The intermediate pressure FLEX pump staging location for non-flood conditions is near the CST which is the suction source for this condition. The intermediate pressure FLEX pump is moved to the Auxiliary Building roof during preparation for flood conditions and the suction source is from the ERCW headers or flood waters. Sequoyah's integrated plan states that the CST will last 10 hours and ERCW header will last 18.5 hours providing a suction source for the TDAFWP for a total of 28.5 hours. The sequence of events timeline begins to "stage steam generator make-up pump from the ERCW system header," at 22 hours and completes by 24 hours. The integrated plan states that in non-flood conditions the CST is the suction source for the intermediate pressure FLEX pumps, however at 10 hours the CST is exhausted and the sequence of events timeline does not provide any action(s) to refill the CST. Provide further details of how this plan will accomplish core cooling and heat removal with the CST as the suction source during phase 2 and provide an update to the sequence of events timeline.
AQ 50	Sequoyah's integrated plan, maintain core cooling & heat removal section states that the boron addition tank (BAT) A will be modified by installing tees on discharge lines of BAT A. However, the core cooling & heat removal section does not discuss when or how the BATs will be utilized. In addition, figure A3-10 shows the connection to all three BATs. Explain when and how the BATs will be utilized, and because figure A3-10 is not legible, discuss what type of lines (i.e., discharge, vent etc.) are used for connection, including the height of the connection into the tank and whether or not there are check valves, orifices, flow restrictors, etc.

Audit Item Reference	Item Description
AQ 53	Please clarify whether calculations have been performed consistent with the PWROG-recommended methodology in Attachment 1 to PA-PSC-0965 to verify that the intended ELAP mitigation strategy will not result in injection of nitrogen from cold leg accumulators or provide justification that the existing calculational methods for determining whether nitrogen injection will occur consider the potential for heating due to the rise of containment temperatures due to loss of normal ventilation, reactor coolant pump seal leakage, etc.
AQ 55	Open Item 3.2.4.7.A - Electrical Isolation and Interactions - Describe how electrical isolation will be maintained such that (a) Class 1E equipment is protected from faults in portable/FLEX equipment and (b) multiple sources do not attempt to power electrical buses.
AQ 61	Open Item 3.3.3.B Configuration Control - Provide Single Line Diagrams showing the proposed connections of Phase 2 and 3 electrical equipment on the e-Portal. Show protection information (breaker, relay etc.) and rating of the equipment on the Single Line Diagrams.
AQ 65	Page E-21 through E-23 of the OIP states that the primary and secondary connection points are located inside the Auxiliary Building for Phase 2 of Maintain Core Cooling & Heat Removal. The OIP clarifies that the Auxiliary Building is a safety related structure and is protected from all external hazards except flooding. For flood conditions procedures will ensure that hoses are connected before the flood levels reach the connection. In addition, it continues to indicate that the connections to the CST and ERCW will be seismically qualified and missile protected; however, for connections required during flood conditions - procedures will ensure that hoses are connected before flood levels reach the connection. Provide a discussion of the time necessary to make these connections in comparison to the anticipated warning time of a flood event.
AQ 67	Page E-32 of the OIP for Phase 2 of maintaining RCS inventory control it states "that analysis shows that the BATs are available for at least 24 hours for floods as summarized in Reference 10... At 24 hours, suction of the RCS pump may need to be switched to the refueling water storage tank (RWST), if the impending flood level is high enough to flood the BATs." If the RWSTs are not missile and/or flood protected (including large debris carried by flood that may damage the tank) - Discuss the availability and strategy to maintain RCS inventory control if the pending flood level is high enough to flood the BATs by 24 hours and before RRC equipment is available.
AQ 68	Provide a summary of non-safety-related installed equipment that is used in the mitigation strategies. Include a discussion of whether the equipment is qualified to survive all ELAP events.
AQ 71	Open Item 3.2.4.9.B - Discuss which components change state when loads are shed and actions needed to mitigate resultant hazards (for example, allowing hydrogen release from the main generator, disabling credited equipment via interlocks, etc.).

Audit Item Reference	Item Description
AQ 72	NEI section 3.2.2 addresses minimum baseline coping capabilities using the N+1 concept for having sufficient equipment on site to address all functions at all units on-site, plus one additional spare. NEI also identifies alternate means for meeting the reliability and availability intended by having a spare. a) The equipment listed in the OIP for Phase 2 shows two 225kVA 480 Vac diesel driven generators which are pre-staged on the roof of the Auxiliary Building. Provide the justification that only two DGs meet the intent of the N+1 criterion. b) The 6 month update described a revised strategy for using the 3 mw DGs for Phase 2 coping. Discuss the N+1 criterion as applied to the two 3 mw diesel generators staged in the new FESB.
AQ 74	Motive Force for steam generator /Power operated relief valve /atmospheric relief valve/ atmospheric dump valve (S/G PORV/ARV/ADV) Operations: (a) Specify the size of the S/G PORV/ARV/ADV backup nitrogen supply source and the required time for its use as motive force to operate the S/G PORV/ARV/ADV for mitigating an ELAP event. (b) Discuss the analysis determining the size of the subject nitrogen supply to show that the nitrogen sources are available and adequate, lasting for the required time. (c) Discuss the electrical power supply that is required for operators to throttle steam flow through the S/G PORV/ARV/ADVs within the required time and show that the power is available and adequate for the intended use before the operator takes actions to manually operate the S/G PORV/ARV/ADVs. (d) Discuss the operator actions that are required to operate S/G PORV/ARV/ADVs manually and show that the required actions can be completed within the required time.
AQ 75	Uncontrolled Cooldown: (a) Clarify whether the S/G PORV/ARV/ADV or upstream associated piping is a safety system, protecting from external events such as tornados, if not, address the following questions: (b) Clarify whether damage to an the S/G PORV/ARV/ADV or upstream associated piping could occur during an ELAP that would result in an uncontrolled cooldown of the reactor coolant system and provide a basis. (c) Clarify whether postulated damage would be limited to a single S/G PORV/ARV/ADV and/or associated piping, or whether failures could be postulated resulting in an uncontrolled cooldown affecting both steam generators and provide a basis. (d) If ELAP scenarios involving the uncontrolled cooldown of one or more steam generators may be postulated, describe key operator actions that would be taken to mitigate these events. (e) If ELAP scenarios involving the uncontrolled cooldown of one or more steam generators may be postulated, provide analysis demonstrating that the intended mitigating actions would lead to satisfaction of the requirements of Order EA-12-049 for these cases. (f) As applicable, if the operator actions to mitigate an ELAP event involving an uncontrolled cooldown results in an asymmetric cooldown of the reactor coolant system, address the consequences of the asymmetric cooldown on the mixing of boric acid that is added to the reactor coolant system to ensure sub-criticality.

Audit Item Reference	Item Description
OIP 2	Liquefaction of haul routes for FLEX will be analyzed.
OIP 5	The Phase 3 equipment staging area has not been determined.
OIP 6	A strategy for clearing and removing debris will be determined.
OIP 7	A thorough analysis of the makeup flow rate requirements and other equipment characteristics will be finalized during the detailed design phase of FLEX.
OIP 9	Functional requirements for each of the Phase 3 strategies, equipment and components will be completed at a later time and will be provided in the six month updates to the February 28, 2013, submittal.
OIP 12	Verify ability to deploy FLEX equipment to provide core cooling in Modes 5 and 6 with steam generators (SGs) unavailable.
OIP 13	An evaluation of the impact of FLEX response actions on design basis flood mode preparations will be performed. This evaluation will include the potential for extended preparation time for FLEX. Changes which affect the Integrated Plan will be included in the six month update.
OIP 14	Perform an alternate cooling source evaluation. The purpose of this analysis is to examine options to utilize alternate water sources to provide continuous sources of water to maintain key safety functions.
OIP 15	Perform conceptual hydraulic performance analyses. The purpose of this analysis is to conservatively evaluate hydraulic performance of FLEX systems.
OIP 16	Develop a mechanical conceptual design report. The purpose of this report is to summarize the mechanical conceptual design of the FLEX strategies and identify any required modifications.
OIP 17	Provide a summary of FLEX electrical conceptual design/modification and drawings/sketches.
OIP 18	Perform an RCS makeup analysis. The purpose of this analysis is to define FLEX RCS inventory and shutdown margin for Sequoyah.
OIP 19	Perform an SFP evaluation. The purpose of this analysis is to evaluate the impact of sloshing and time-to-boil in the SFP after an earthquake.
OIP 20	Perform a timing and deployment evaluation. The purpose of this analysis is to summarize the FLEX timeline for Sequoyah, identify time constraints and provide for the safety function needs.
OIP 21	Develop a programmatic control report. The purpose of this report is to summarize the need to implement programmatic control of the FLEX program.
OIP 22	Evaluate the existing extreme hazard analysis and planned Near-Term Task Force (NTTF) Tier 1 activities on FLEX strategies to summarize ongoing industry activities and the potential to impact the developed FLEX strategies.
OIP 23	The time at which the Forebay volume depletes needs to be evaluated to determine the time at which replenishment is required. Based on Reference 10 there is 1,640,000 gallons available in the Forebay. Based on the alternate cooling source evaluation, approximately 640,000 gallons are required at 72 hours post ELAP. Therefore, it is expected the Forebay volume will supply suction to the TDAFWP for greater than 72 hours following the ELAP event and replenishment will be required during Phase 3.

Audit Item Reference	Item Description
OIP 24	Further analysis will be performed to determine the required timeline for implementing the 6.9 KV FLEX DGs as an alternate power source for the loads supplied by the 480v FLEX DGs.
OIP 26	The CETs are only available until water enters the auxiliary instrument room. A method to monitor CET, post flood, will be evaluated and developed, if required.
OIP 27	Strategies to address extreme cold conditions on the RWST and/or BATs, including potential need to reenergize heaters have not been finalized.
OIP 28	Establish a contract with the SAFER team in accordance with the requirements of Section 12 of Reference 2.
SFPI RAI 1	Please provide a clearly labeled sketch or marked-up plant drawing of the plan view of the SFP area, depicting the SFP inside dimensions, the planned locations/placement of the primary and backup SFP level sensor and mounting brackets, and the proposed routing of the cables that will extend from the sensors toward the location of the read-out/display devices.
SFPI RAI 2	Please provide the following: a) The design criteria 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 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 to support the level sensor assembly.
SFPI RAI 3	For RAI 2a above, please provide the results of the analyses used to verify the design criteria and methodology for seismic testing of the SFP instrumentation and the electronics units, including, design-basis maximum seismic loads and the hydrodynamic loads that could result from pool sloshing or other effects that could accompany such seismic forces.
SFPI RAI 4	For each of the mounting attachments required to attach SFP Level equipment to plant structures, please describe the design inputs, and the methodology used to qualify the structural integrity of the affected structures/equipment.

Audit Item Reference	Item Description
SFPI RAI 5	Please provide the following: a) A description of the specific method or combination of methods that will be used to demonstrate the reliability of the permanently installed equipment under BDB ambient temperature, humidity, shock, vibration, and radiation conditions. b) A description of the testing and/or analyses that will be conducted to provide assurance the equipment will perform reliably under the worst-case credible design basis loading at the location where the equipment will be mounted. Include a discussion of this seismic reliability demonstration as it applies to a) the level sensor mounted in the SFP area, and b) any control boxes, electronics, or read-out and re-transmitting devices that will be employed to convey level information from the level sensor to the plant operators or emergency responders. c) A description of the specific method or combination of methods that will be used to confirm the reliability of the permanently installed equipment such that following a seismic event the instrument will maintain its required accuracy.
SFPI RAI 6	For RAI No. 5 above, please provide the results from the selected methods, tests and analyses used to demonstrate the qualification and reliability of the installed equipment in accordance with the order requirements.
SFPI RAI 7	Please provide the NRC staff with the final configuration of the power supply source for each channel so that the staff may conclude the two channels are independent from a power supply assignment perspective.
SFPI RAI 8	Please provide the results of the calculation depicting the battery backup duty cycle requirements demonstrating battery capacity is sufficient to maintain the level indication function until offsite resource availability is reasonably assured.
SFPI RAI 9	Please provide the following: a) An estimate of the expected instrument channel accuracy performance (e.g., in % span) under both a) normal SFP level conditions (approximately Level 1 or higher) and b) at the BDB conditions (i.e., radiation, temperature, humidity, postseismic and post-shock conditions) that would be present if the SFP level were at the Level 2 and Level 3 datum points. b) A description of the methodology to be used for determining the maximum allowed deviation from the instrument channel design accuracy under normal operating conditions. Staff understands this allowed deviation will serve as an acceptance criterion for a calibration procedure to alert operators and technicians that the channel requires adjustment to within normal design accuracy.

Audit Item Reference	Item Description
SFPI RAI 10	Please provide the following: a) A further description of the capability and provisions the proposed level sensing equipment will have to enable periodic testing and calibration, including how this capability enables the equipment to be tested in situ. b) Explain how such testing and calibration will enable the conduct of regular channel checks of each independent channel against the other, and against any other permanently-installed SFP level instrumentation. c) Explain the calibration tests and functional checks to be performed and the frequency at which they will be conducted. Discuss how these surveillances will be incorporated into the plant surveillance program. d) Describe the preventive maintenance tasks required to be performed during normal operation, and the planned maximum surveillance interval that is necessary to ensure that the channels are fully conditioned to accurately and reliably perform their functions when needed.
SFPI RAI 11	For the display location outside the [main control room] MCR, please describe the evaluation used to validate the secondary display location can be accessed without unreasonable delay following a BDB event. Include the time available for personnel to access the display location as credited in the evaluation, as well as the actual time (e.g., based on walk-through) that it will take for personnel to access the display locations. Additionally, include a description of the radiological and environmental conditions on the paths personnel might take. Describe whether the secondary 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 secondary display location or monitor the display periodically.
SFPI RAI 12	Please provide a list of the procedures addressing operation (both normal and abnormal response), calibration, test, maintenance, and inspection to be developed for use of the SFP instrumentation. Include a brief description of the specific technical objectives to be achieved within each procedure.
SFPI RAI 13	Please provide the following: a) Further information describing the maintenance and testing program the licensee will establish and implement to ensure that regular testing and calibration is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. Include a description of plans to ensure that necessary channel checks, functional tests, periodic calibration, and maintenance will be conducted for the level measurement system and its supporting equipment. b) A description of the guidance in NEI12-02 section 4.3 on compensatory actions for one or both non-functioning channels. c) A description of the compensatory actions to be taken in the event that one of the instrument channels cannot be restored to functional status within 90 days.
SFPI RAI 14	Please provide a description of the in situ calibration process at the SFP location that will result in the channel calibration being maintained at its design accuracy.

Audit Item Reference	Item Description
SE 1	Instrumentation - Review identified a concern with the level of accuracy of the FLEX instrumentation to insure that the electrical equipment remains protected (from an electrical standpoint - e.g., power fluctuations etc.) and with the ability of this instrumentation to provide operators with accurate information ensure maintenance of core cooling, containment, and spent fuel cooling. The licensee should confirm the following: 1a). All instruments related to the installed electrical equipment inside containment are designed to meet the design basis accident. The instruments outside containment are environmentally qualified for the area where they are located. All the instruments are calibrated to comply with technical specifications requirements. 2). Cases where portable instruments are used (e.g., Fluke) these instruments will be maintained in accordance with the plant Maintenance and Test Equipment program and are qualified to the same requirements as other M&TE controlled by this program. 3). The installed plant equipment is protected from adverse electrical interactions with the portable equipment by utilizing procedure controls and modifications that only allow the alignment of a single power source to the electrical bus. Provide procedure and modification references, if any. 4). The installed indications on the portable equipment will not be used to make critical decisions related to plant parameters because the instrumentations provided on the portable electrical equipment are typically purchased as commercial grade and may not provide accurate information. However, these instruments may provide reasonable indication on the performance of this (portable) equipment.

Audit Item Reference	Item Description
SE 2	(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 PWRs vent the RCS while makeup is being provided. a. If the mitigating strategy will include venting of the RCS, 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. b. 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 3	(Westinghouse Standard RCP Seals: NSAL-14-1) On February 10, 2014, Westinghouse issued Nuclear Safety Advisory Letter (NSAL)-14-1, which informed 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 PWRs, including the generic reference analysis in WCAP-17601-P. Therefore, please provide the following information: a. 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. b. Identify the corresponding leakage rate from NSAL-14-1 or other associated documents (e.g., PWROG-14015-P, PWROG-14027-P) that is deemed applicable. c. Provide the plant-specific design parameters associated with the seal leakoff line and confirm whether they are bounded by each of the model input parameters in Table 2 of PWROG-14015-P for the appropriate analysis category. If any parameters in Table 2 are not bounded, please provide justification that the generically calculated leakage rate and maximum pressure are applicable. d. Confirm that the #1 seal faceplate material is silicon nitride for all RCPs. Alternately, if one or more RCPs use a different material, please identify the material used and provide justification for the leakage rate assumed to apply to these RCPs. e. Provide the set pressure and flow area associated with the relief valve on the #1 seal leakoff line common header piping. f. Provide an estimate of the piping diameter, length, and number and type of components for the seal leakoff line common header piping. g. If plant modifications will be undertaken to move the plant to a more favorable category relative to RCP seal leakage, please identify the applicable modifications and discuss the associated completion timeline.
SE 4	Please provide adequate justification for the seal leakage rates calculated according to the Westinghouse seal leakage model that was revised following the issuance of NSAL-14-1. The justification should include a discussion of the following factors: a. benchmarking of the seal leakage model against relevant data from tests or operating events, b. discussion of the impact on the seal leakage rate due to fluid temperatures greater than 550°F resulting in increased deflection at the seal interface, c. clarification whether the second-stage reactor coolant pump seal would remain closed under ELAP conditions predicted by the revised seal leakage model and a technical basis to support the determination, and, d. justification that the interpolation scheme used to compute the integrated leakage from the reactor coolant pump seals from a limited number of computer simulations (e.g., three) is realistic or conservative.

Audit Item Reference	Item Description
SE 5	The NRC staff understands that Westinghouse has recently recalculated seal leakoff line pressures under loss of seal cooling events based on a revised seal leakage model and additional design-specific information for certain plants. a. Please clarify whether the piping and all components (e.g., flow elements, flanges, valves, etc.) in your seal leakoff line are capable of withstanding the pressure predicted during an ELAP event according to the revised seal leakage model. b. Please clarify whether operator actions are credited with isolating low-pressure portions of the seal leakoff line, and if so, please explain how these actions will be executed under ELAP conditions. c. If overpressurization of piping or components could occur under ELAP conditions, please discuss any planned modifications to the seal leakoff piping and component design and the associated completion timeline. d. Alternately, please identify the seal leakoff piping or components that would be susceptible to overpressurization under ELAP conditions, clarify their locations, and provide justification that the seal leakage rate would remain in an acceptable range if the affected piping or components were to rupture.
SE 6	(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 as 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 7	(ELAP Calculations with NOTRUMP) 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.
SE 8	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.

Audit Item Reference	Item Description
SE 9	a. Discuss the design of the suction strainers used with FLEX pumps taking suction from raw water sources, including perforation dimension(s) and approximate surface area. b. Provide reasonable assurance that the strainers will not be clogged with debris (accounting for conditions following, flooding, severe storms, earthquakes or other natural hazards), or else that the strainers can be cleaned of debris at a frequency that is sufficient to provide the required flow. In the response, consider the following factors: i. The timing at which FLEX pumps would take suction on raw water relative to the onset and duration of the natural hazard. ii. The timing at which FLEX pumps would take suction on raw water relative to the timing at which augmented staffing would be available onsite. iii. Whether multiple suction hoses exist for each FLEX pump taking suction on raw water, such that flow interruption would not be required to clean suction strainers.
SE 10	Verify that appropriate human factors are applied for the implementation of the FLEX strategies.

Part 3 – Specific Topics for Discussion:

1. Draft of Sequoyah 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. NSRC (SAFER) Response Plan
6. The licensee's plan for coordination with Tennessee State authorities for delivery of Phase 3 FLEX equipment.
7. Check the status of upgrades to the site's communications systems as noted in NRC letter dated April 30, 2013 (ADAMS Accession No. ML13116A125)

Proposed Schedule

Onsite Day 1, Monday, December 1, 2014

1300 Audit team arrives onsite on site/badging/dosimetry

1500 Entrance meeting/licensee presentation of strategies

Onsite Day 2, Tuesday, December 2, 2014

0800 Check in onsite

0830 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.

1200 Lunch

1300 Plant walkdowns/mitigating strategies and SFPI walk-throughs with licensee

1600 NRC audit team meeting

1630 Team lead daily debrief/next day planning with licensee

Onsite Day 3, Wednesday, December 3, 2014

0800 Check in onsite/meet with Senior Resident/Resident

0900 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.

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 4, Thursday, December 4, 2014

0800 Check in onsite/continue NRC audit team activities

1200 Lunch

1300 Continue NRC audit team activities

1330 NRC audit team meeting

1630 NRC/Licensee pre-exit meeting

Onsite Day 5, Friday, December 5, 2014

0800 Check in onsite/NRC audit team exit meeting preparation

0900 NRC/Licensee exit meeting

1000 Audit closeout/departure

The NRC staff's review led to the issuance of the Sequoyah ISE and RAI dated November 21, 2013 (ADAMS Accession No. ML13312A415). 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 Sequoyah in accordance with the enclosed audit plan from December 1-5, 2014.

If you have any questions, please contact me at 301-415-1924 or by e-mail at tony.brown@nrc.gov.

Sincerely,
/RA/
Tony Brown, Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos.: 50-327 and 50-328

Enclosure:
Audit plan

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OFFICE	NRR/JLD/JOMB/PM	NRR/JLD/LA*	NRR/JLD/JCBB/BC*	NRR/JLD/JERB/BC
NAME	TBrown	SLent	SBailey (BHeida for)	BPham
DATE	10/29/14	10/30/14	11/04/14	11/05/14
OFFICE	NRR/JLD/JOMB/BC(A)*	NRR/DORL/LPL2-2/PM*	NRR/JLD/JOMB/PM	
NAME	CRoque-Cruz	AHon (FSaba for)	TBrown	
DATE	11/04/14	11/05/14	11/06/14	

OFFICIAL AGENCY RECORD