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

August 5, 2014

Mr. James A. Spina
Vice President Corporate Site Operations
Constellation Energy Nuclear Group, LLC
100 Constellation Way, Suite 200C
Baltimore, MD 21202

SUBJECT: CALVERT CLIFFS NUCLEAR POWER 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. MF1142, MF1143, MF1140, AND MF1141)

Dear Mr. Spina

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. ML13066A171), Constellation Energy Nuclear Group, LLC (CENG, the licensee) submitted its OIP for Calvert Cliffs Nuclear Power Plant, Units 1 and 2 (Calvert Cliffs), in response to Order EA-12-049. By letter dated March 8, 2013 (ADAMS Accession No. ML13074A056), CENG submitted a complete revision of the OIP for Calvert Cliffs. By letters dated August 27, 2013, and February 27, 2014 (ADAMS Accession Nos. ML13254A278 and ML14069A318, respectively), the licensee 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). This audit process led to the issuance of the Calvert Cliffs' interim staff evaluation (ISE) and audit report (ADAMS Accession No. ML13225A566) and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13066A172), the licensee submitted its OIP for Calvert Cliffs in response to Order EA-12-051. By letter dated June 19, 2013 (ADAMS Accession No. ML13164A393), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated July 3, 2013, August 27, 2013, and February 24, 2014 (ADAMS Accession Nos. ML13190A017, ML13254A279, and ML14069A180, respectively), the licensee submitted its RAI responses and first two six-month updates to the OIP.

The NRC staff's review to date led to the issuance of the Calvert Cliffs ISE and RAI dated November 15, 2013 (ADAMS Accession No. ML13281A205). 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 Calvert Cliffs in accordance with the enclosed audit plan from September 8 - 11, 2014.

If you have any questions, please contact me at 301-415-5888 or by e-mail at Jason.paige@nrc.gov.

Sincerely,

Stephen R Monarque for

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

Docket Nos.: 50-317 and 50-318

Enclosure:
Audit plan

cc w/encl: Distribution via Listserv

Mr. George H. Gellrich, Vice President
Calvert Cliffs Nuclear Power Plant, LLC
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

Audit Plan
Calvert Cliffs Nuclear Power 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* 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. ML13066A171), Constellation Energy Nuclear Group, LLC (CENG, the licensee) submitted its OIP for Calvert Cliffs Nuclear Power Plant, Units 1 and 2 (Calvert Cliffs, CCNPP), in response to Order EA-12-049. By letter dated March 8, 2013 (ADAMS Accession No. ML13074A056), CENG submitted a complete revision of the OIP for Calvert Cliffs. By letters dated August 27, 2013, and February 27, 2014 (ADAMS Accession Nos. ML13254A278 and ML14069A318, respectively), the licensee 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). This audit process led to the issuance of the Calvert Cliffs' interim staff evaluation (ISE) and audit report (ADAMS Accession No. ML13225A566) and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13066A172), the licensee submitted its OIP for Calvert Cliffs in response to Order EA-12-051. By letter dated June 19, 2013 (ADAMS Accession No. ML13164A393), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated July 3, 2013, August 27, 2013, and February 24, 2014 (ADAMS Accession Nos. ML13190A017, ML13254A279, and ML14069A180, respectively), the licensee submitted its RAI responses and first two six-month updates to the OIP. The NRC staff's review to date led to the issuance of the Calvert Cliffs ISE and RAI dated November 15, 2013 (ADAMS Accession No. ML13281A205). 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.

Enclosure

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 Calvert Cliffs 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/Project Manager	Jason Paige
Technical Support	Joshua Miller
Technical Support	Michael Levine
Technical Support	Kerby Scales
Technical Support	Carla Roque-Cruz

NRC AUDIT TEAM – SUPPLEMENTAL MEMBERS

Title	Team Member
Associate Director	John McHale
Project Manager	Steve Monarque
Project Manager	Chuck Norton

LOGISTICS

The audit will be conducted onsite at Calvert Cliffs on September 8-11, 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) Calvert Cliffs 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. Assess the potential of electromagnetic interference (EMI).

Part 2 – Specific Technical Review Items:

During the visit, the following audit items will be addressed from the licensee's ISEs open items (OIs), confirmatory items (CIs), 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 3.2.1.1.A	The licensee will need to perform a plant specific analysis of RCS cooling and inventory control. If the CENTS code is used, the value of flow quality at the upper region of SG tubes for the condition when the RCS makeup pump is required to inject water into the RCS will also need to be submitted, and the licensee should confirm that CENTS is not used outside of any ranges of applicability discussed in the white paper addressing the use of CENTS (e.g., prior to the reflux boiling initiation). If other codes are used for the [extended loss of alternating current (ac) power] ELAP analysis, the licensee will need to justify the acceptance of the codes for this use.

Audit Item Reference	Item Description
ISE OI 3.2.1.1.B AQ 23 Licensee OIP open items 40, 61, 62, and 63	The licensee's plan for analysis for core and containment cooling is still under development and CENG will identify additional analysis to support the mitigating strategies. The subjects of the analyses are: maintaining core cooling (e.g., confirm shutdown margin during cooldown, [direct current] dc load shedding, and adequate steam pressure for [turbine-driven auxiliary feedwater] TDAFW pump operation), containment temperature and pressure response for containment cooling, and various safety functions regarding ventilation and cooling systems (e.g., for the main control room, TDAFW pump room, cable spreading room, battery rooms, switchgear rooms and the SFP area). Provide these analyses so that the staff can confirm acceptability of the mitigating strategies.
ISE OI 3.2.1.8.A	During the audit process, the licensee informed the NRC staff of its intent to abide by the Pressurized-Water Reactor Owners Group (PWROG) generic approach regarding boric acid mixing discussed in Section 3.2.1.8 of Calvert Cliff's Interim Staff Evaluation; however, the NRC staff concluded that the August 15, 2013, position paper was not adequately justified and that further information is required. Provide a discussion to address each of the three limitations imposed in the NRC letter endorsing the Boron Mixing Model White paper (ADAMS Accession No. ML13276A183).
ISE CI 3.1.1.1.A ISE CI 3.1.1.1.B	On page 8 of the Integrated Plan, the licensee specified that Phase 2 FLEX components will be stored at the site in a location or locations such that they are reasonably protected and that no one external event can reasonably fail the site FLEX capability. Provision will be made for multiple sets of portable on-site equipment stored in diverse locations or through storage in structures designed to reasonably protect from applicable external events. Provide the locations of the FLEX equipment storage areas.
ISE CI 3.1.1.4.A ISE CI 3.1.2.2.A ISE CI 3.1.2.2.B ISE CI 3.1.4.2.B ISE CI 3.2.4.5.A	The licensee has not yet identified the local staging area or described the methods to be used to deliver the equipment to the site for all hazards. Provide a playbook which will outline the detail necessary to ensure the successful delivery of the portable FLEX equipment from the RRC to the local staging area and from the local staging area to the site.
ISE CI 3.1.2.2.C Licensee OIP open item 79	The licensee specified that primary access to the [Ultimate Heat Sink] UHS is via the openings in the CW Discharge Structure (plant outfall). An alternate UHS location has not been established; however, the licensee has identified an open item to implement a design change to install a protected alternate means of accessing the UHS for all BDBEEs, including installing necessary modifications to meet required deployment times. The strategy must also address how debris in the UHS will be filtered and/or strained and how the resulting debris will affect core cooling. Provide a plan to use alternate access points to the UHS.
ISE CI 3.1.3.2.A Licensee OIP open items 77 & 78	The licensee specified that CCNPP currently has a varied array of wheeled vehicles, e.g., forklifts, small tractors, and a backhoe, that could be used for debris removal. However, the licensee did not specify if this equipment would be protected from high wind and other hazards. Provide information if debris removal equipment will be protected from high winds and other hazards.

Audit Item Reference	Item Description
ISE CI 3.1.4.2.A AQ 5	Provide procurement requirements to ensure that the FLEX equipment can be operated in extreme hot or cold temperature environments or how hot or cold temperatures will affect manual actions.
ISE CI 3.2.1.5.A	Provide an analysis to confirm instruments are reliable and accurate in the containment harsh conditions with high moisture levels, temperature and pressure during the ELAP event.
ISE CI 3.2.1.6.A ISE CI 3.2.1.6.B	The following references used as basis for several sequence of events (SOE) Action Time constraints were not available for review: CCN0012-17-STUDY-001, and CCNPP FLEX Strategy Table Top. Provide the above references.
ISE CI 3.2.1.7.A	The generic concern related to the shutdown and refueling modes, required clarification of CCNPP's approach to demonstrate that the strategies can be implemented in all modes. Provide justification that Calvert Cliffs' plan can be implemented in all modes.
ISE CI 3.2.1.9.C AQ 42 Licensee OIP open item 92	Provide revised analyses as detailed engineering evaluations for each Phase 3 FLEX component and modification strategy.
ISE CI 3.2.2.A AQ 41	The licensee did not discuss the impacts of salt/brackish water on the structures and components of the SFP system, and the fuel. During the audit process, the licensee specified that they will perform an analysis to determine the effects of salt/brackish water on the structures and components (including instrumentation of the SFP system and the stored fuel). Provide an analysis to determine the effects of salt/brackish water on the structures and components.
ISE CI 3.2.2.B	The licensee will perform an analysis to verify that the proposed strategy for SFP ventilation will provide sufficient air flow to vent steam from the SFP area, in order to determine whether natural air circulation is sufficient, or forced ventilation provided by FLEX equipment will be required. Provide the referenced analysis to show that SFP ventilation will provide sufficient air flow to vent steam from the SFP area.
ISE CI 3.2.4.1.A	Charging pump room ventilation is provided by the non-safety related Auxiliary Building Supply and Exhaust Ventilation System. An evaluation will be performed to determine if the charging pumps can meet their mission time without room ventilation. Provide the referenced analysis to determine if the charging pumps can meet their mission time without room ventilation.
ISE CI 3.2.4.2.C	The licensee identified an open item to perform an analysis to evaluate hydrogen buildup in the battery rooms during charging and room temperature profiles. Provide the referenced analysis.
ISE CI 3.2.4.2.D	The licensee identified an open item to perform an analysis to determine the Switchgear Room temperature response following the reenergizing of buses and assuming various 480 VAC load center and 4160 VAC bus loadings over a period of 72 hours. Provide the referenced analysis.
ISE CI 3.2.4.2.E	The West Electrical Penetration Rooms will begin to heat up after the reactor motor control centers (MCC) are re-energized from the FLEX 480 VAC DGs; therefore, they will need to be evaluated for limiting temperatures for equipment survivability. Provide an evaluation that the equipment in the West Electrical Penetration Rooms will survive the increase in temperature when the reactor MCC are re-energized.

Audit Item Reference	Item Description
ISE CI 3.2.4.4.A Licensee OIP open items 70, 71, 72, 73	On page 56 of the Integrated Plan, the licensee identified five open items to; 1) investigate changing Appendix R lighting batteries to a longer life battery or new battery technology to lengthen the duration of lighting available in vital areas of the plant, 2) procure battery operated hardhat mounted lights ("miners" lights) for on-shift and emergency response organization (ERO) personnel, 3) to procure a sufficient quantity of hand-held battery operated hardhat lanterns for on-shift and ERO personnel, 4) to procure six (6) portable diesel generator powered exterior lighting units with 30 ft. masts and a minimum 400,000 lumens, and 5) to change Appendix R lighting from incandescent to LED to lengthen the duration of lighting available in vital areas of the plant. Provide the status of the above open items.
ISE CI 3.2.4.4.B AQ 30 Licensee OIP open items 74, 75, 76	The NRC staff reviewed the licensee communications assessment and has determined that the assessment for communications is reasonable, and the analyzed existing systems, proposed enhancements, and interim measures will help to ensure that communications are maintained. Confirm that upgrades to the site's communications systems have been completed.
ISE CI 3.2.4.6.C Licensee OIP open item 64	The licensee identified two open items to perform an analysis to determine the possible effects of BDBEE on the turbine building structure and the potential effect on access to the TDAFW pump room, and to develop an alternate access strategy for access into the TDAFW pump room. Discuss the alternate access to the TDAFW pump room.
ISE CI 3.2.4.8.A	The medium voltage 4160 VAC generators and the low voltage 480 VAC 800 kW generators that will arrive from the RRC will have protective devices as specified in AREVA document 51- 9199717-000. An evaluation will be performed to verify the internal protection is adequate to protect the 1 E buses. Provide the referenced evaluation.
ISE CI 3.2.4.8.B Licensee OIP open item 42	One 480 VAC/675 KVA diesel generator set will be deployed for each unit to connect to one vital 480 VAC load center on that unit. The 480 VAC/125 KVA diesel generators are intended as an alternate strategy to connect to one of two vital reactor MCCs on each unit. The supplied reactor MCC can be cross-connected to the redundant train reactor MCC on that unit. An evaluation to validate the intended use of these diesel generators is pending. Provide the referenced evaluation.
ISE CI 3.2.4.9.A AQ 43 Licensee OIP open items 86 & 87	The licensee identified Open items to perform an analysis of the fuel consumption rate for all of the FLEX equipment that could be in operation during an ELAP for a period of 72 hours to determine a conservative refueling interval, and to develop strategies to reduce the transport time for fuel oil loading and delivery. Provide the fuel consumption and refueling strategies.

Audit Item Reference	Item Description
ISE CI 3.2.4.10.A AQ 33 AQ 34	On page 19 of the Integrated Plan, the licensee identified Open Items: to implement a design change to clearly identify the set of dc load breakers that will either be left energized or load shed by identifying the selected breakers by their unique numbers and load title; to implement a procedure or FSG to perform the dc load shedding; and to complete a time-motion study to validate that dc load shedding can be accomplished on each unit in one hour. 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 crediting equipment via interlocks etc.). Provide the basis for the minimum dc bus voltage that is required to ensure proper operation of all required electrical equipment.
ISE CI 3.2.4.10.B	Maintenance of vital 125 VDC power will include aligning the reserve battery to one of the four vital 125 VDC buses via bus work and disconnects that are currently being installed under an existing plant modification. This action will extend the coping time for one vital 125 VDC bus to greater than 20 hours. Provide a copy of the analysis/calculations which shows aligning the reserve battery to one of the four 125 VDC buses can extend the coping time for one vital 125 VDC bus to greater than 20 hours.
ISE CI 3.4.A	In accordance with NEI 12-06 Section 12.2, provide the minimum capabilities on the use of off-site resources to obtain equipment and commodities to sustain and backup the site's coping strategies.
AQ 1	NEI 12-06 Section 5.3.2, Consideration 4 provides guidance on the need for power to move or deploy the equipment (e.g., to open the door from a storage location). Is there a need for any power supply to provide access for FLEX equipment? If so, please discuss how this will be addressed.
AQ 2	CENG's plans for the development of the mitigating strategies did not address determination of necessary instrument readings per NEI 12-06 Section 5.3.3, Consideration 1, to support the implementation of the mitigating strategies in the event that seismically qualified electrical equipment is affected by beyond-design-basis seismic events. Provide a discussion regarding a reference source and guidance for determining local instrument readings.
AQ 3	CENG's plans for the development of mitigating strategies did not provide information with respect to the procedural interface considerations for seismic hazards associated with: 1) large internal flooding sources that are not seismically robust and do not require ac power, and 2) the use of ac power to mitigate ground water in critical locations, per NEI 12-06 Section 5.3.3, Considerations 2 and 3. Provide a discussion regarding these issues if they are relevant to CCNPP.

Audit Item Reference	Item Description
AQ 8	(1) Discuss whether the uniform boron mixing model was used in the ELAP analysis. If the perfect boron mixing model was used, address compliance with the recommendations discussed in a PWROG whitepaper related to the boron mixing model. If a different model was used, address the adequacy of the use of the boron mixing model in the ELAP analysis with support of an analysis and/or boron mixing test data applicable to the ELAP conditions, where the RCS flow rate is low and the RCS may involve two-phase flow. If boron mixing test data exist that are applicable to the boron mixing model and the ELAP event, provide a discussion of how the model matches the data. Also, discuss how the boron concentration in the borated water added to the RCS is considered in the cooldown phase of the ELAP analysis, considering that it needs time for the added borated water to mix with water in the RCS. (2) Discuss the plant specific boration analysis and the results, and show that the core will remain subcritical throughout the ELAP event.
AQ 9	Identify the installed non-safety related systems or equipment that are credited in establishing the ELAP mitigation strategies. For all the systems or equipment identified, discuss the intended mitigation functions, and justify that they are available and reliable to provide the desired functions on demand during the ELAP conditions.
AQ 12	CENG provided information regarding generic analysis performed by Westinghouse and appropriately refers to PWROG generic activities that are underway. A plant specific analysis has not been provided that serves as the basis for the timing of mitigating strategies and maintaining core cooling and RCS inventory. Provide a discussion regarding plant specific analysis needed to support CCNPP's mitigating strategies. The information to be submitted should include the following item: Table 1 (pages 68-69) and Table 2 (pages 70-71) of the integrated plan list the portable equipment required for the ELAP mitigation. Table 1 lists three FLEX pumps with a capacity of 300 gpm at 220 psig and two portable compressors with a capacity of 185 CFM at 100 psig for use to maintain core cooling and sub-criticality during phase 2. For Phase 3, Table 2 lists two FLEX pumps with a minimum flow rate of 500 gpm and maximum pressure of 500 psi, two FLEX high pressure pumps with a flow rate of 60 gpm for the pressure range from 1000 to 3000 psi, and two FLEX pumps with a flow rate of 2500 gpm and maximum pressure of 300 psi. Please provide the following information: a) Specify the required time (mission time) for the operator to deploy each of the above discussed pumps and confirm that the required times are consistent with the results of the ELAP analysis; b) Discuss the analyses that are used to determine the required flow rate and corresponding pressure for each of the portable pumps; and c) Justify that the required capacity and mission time for each of the above discussed portable pumps are adequate to maintain core cooling, and sub-criticality during phases 2 and 3 of ELAP. The information should include a discussion and justification of computer codes/methods and assumptions used in the analyses in above item b.

Audit Item Reference	Item Description
AQ 16	Provide a discussion regarding the determination of the RCP seal leakage rates applicable to the plant specific ELAP analysis. The information to be submitted should include the following items: Address the applicability of Assumption 2 on page 4-35 of WCAP-17601, which states that "Once RCP seal failure occurs, the leakage flow path characteristics remain constant for the rest of the event." If Assumption 2 is not applicable, discuss the rationale for the non-applicability. If it is applicable, address the adequacy of the assumption throughout the ELAP event with consideration of the information in Section 4.4.2 of WCAP-17601 quoted in above item 2. Also, address the effects of the assumption on the calculated pressure-dependent RCP seal leakage rates during the ELAP event.
AQ 17	Provide a discussion regarding the determination of the RCP seal leakage rates applicable to the plant specific ELAP analysis. The information to be submitted should include the following items: Regarding the RCP seal failure, Section 6.7 of WCAP-17601 states that "any seal temperature excursions above 500 degrees F are cause for concern and need to be minimized. The upper seal stages and vapor seal should remain intact if CBO and pressure protocol is initiated soon after an ELAP. Maintaining the seal stages above 350 degrees F should allow plant operators to minimize leakage to containment." Address the applicability of the above statements from Section 6.7 of WCAP-17601 to the ELAP analysis.
AQ 18	Provide a discussion regarding the determination of the RCP seal leakage rates applicable to the plant specific ELAP analysis. The information to be submitted should include the following items: Discuss how the analysis calculates the pressure-dependent RCP seal leakage rates. If the analysis uses the equivalent size of the break area based on the initial total RCP seal leakage rate and a specific flow model to calculate the pressure-dependent RCP seal leakage rates during the ELAP, discuss and justify the flow rate model used. Discuss whether or not the size of the break area is changed in the analysis for the ELAP event. If the size is changed, discuss the changed sizes of the break area and address the adequacy of the sizes. If the break size remains unchanged, address the adequacy of the unchanged break size throughout ELAP event in conditions with various pressure, temperature (considering that the seal material may fail due to an increased stress induced by cooldown) and flow conditions that may involve two-phase flow which is different from the single phase flow modeled for the RCP seal tests that are used to determine the initial total RCP seal leakage rate assumed in the ELPA analysis.
AQ 21	On page 68 of 109 of the integrated plan, the licensee provided a list of PWR portable equipment for Phase 2 of the mitigation strategies. In the list are included two (2) 480 VAC diesel generators rated 125 kVA each, and two (2) 480 VAC diesel generators rated 675 kVA each. Provide a summary of sizing calculations of these diesel generators. Identify all the loads which will be fed from each of these diesel generators. Also, provide single line diagrams on the E-portal showing the proposed connection of the Phase 2 diesel generators. To the 480 V system. Include breaker/relay protection information on the single line diagrams. Clarify how these portable generators will be deployed to meet the N+1 requirement as it appears the Units 1 and 2 switchgear are not cross connected.

Audit Item Reference	Item Description
AQ 32	CENG's integrated plan did not provide any information regarding electrical isolation with respect to the guidance in NEI 12-06 Section 3.2.2 paragraph (13) regarding electrical isolation of portable equipment. 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 37 Licensee OIP open item 22	On page 3 of the licensee's integrated plan, in the paragraph titled "Implementation Capability Requirements Overview," the licensee states that permanent plant equipment, cooling and makeup water inventories, and fuel for FLEX equipment contained in systems or structures with designs that are robust with respect to seismic events, floods, high winds and associated missiles are available, and that installed equipment that is not robust is assumed to be unavailable. On page 19, the licensee states that, during Phase 1, prior to depletion of 12 Condensate Storage Tank (CST) suction is shifted to either 11 or 21 CSTs. The 11 and 21 CSTs do not have the requisite wind-driven missile protection. Provide a justification for assuming that the 11 and 21 CSTs (which are installed equipment that are not robust) are available for use. In addition, provide a detailed evaluation of the coping time of the 12 CST including consumption rates (and bases for rates) per unit for times 0-2 hrs. (maintain after reactor trip), 2-6 hrs. (cooldown to 350 °F), and >6 hrs. (maintain post-cooldown)
AQ 38	On page 3 of the licensee's integrated plan, in the paragraph titled "Implementation Capability Requirements Overview," the licensee states that permanent plant equipment, cooling and makeup water inventories, and fuel for FLEX equipment contained in systems or structures with designs that are robust with respect to seismic events, floods, high winds and associated missiles are available, and that installed equipment that is not robust is assumed to be unavailable. On page 21, the licensee states that if the reactor vessel head is removed and the refueling pool (RFP) is or can be filled, then decay heat is removed by the RFP via a gravity fill line-up to the RFP from the refueling water tank (RWT). The RWT does not have the requisite wind-driven missile protection. Provide a technical justification for assuming that the RWT (which is installed equipment that is not robust) is available for use.
AQ 46	Provide additional details to show how the planned maintenance and testing of FLEX electrical equipment such as batteries, cables, and diesel generators will conform to the guidance of NEI 12-06, Section 11.5.
Licensee OIP open item 2	Provide the design change to install permanent protected FLEX equipment connection points.
Licensee OIP open item 4	Develop a process for implementation of exceptions for the site security plan or other (license/site specific - 1OCFR50.54X) requirements of a nature requiring NRC approval. Provide status of the development of the referenced process.
Licensee OIP open item 15	Implement a design change to replace the 1 ft. diameter wheel with a 3 ft. wheel on each Atmospheric Dump Valve (ADV) chain operator. Provide status of the design change.
Licensee OIP open item 17	Develop a procedure or FSG to perform an early cooldown and depressurization as recommended by WCAP- 17601 -P. Provide the procedure to perform an early cooldown and depressurization as recommended by WCAP- 17601 –P.

Audit Item Reference	Item Description
Licensee OIP open item 19	Implement a design change to re-power the [Safety Injection Tank] SIT level and pressure indicators from a vital 120 VAC instrument bus. Provide information on the referenced design change.
Licensee OIP open item 27	Implement a design change to install an 8-hour Uninterruptible Power Supply (UPS) on the Mansell RCS Level Monitoring System. Provide information on the referenced design change.
Licensee OIP open item 31	Develop a procedure or FSG to mimic the AFW makeup strategy described in ERPIP-61 1, Attachment 1. Provide the referenced procedure.
Licensee OIP open item 43	Implement a design change to provide direct connection of a portable 100 kW diesel generator to reactor [Motor Control Centers] MCCs 104 or 114 and 204 or 214 to provide power to the inverter backup bus (which can power the 120 VAC vital bus), the SIT Outlet [Motor Operated Valves] MOVs, and the AFW Pump Room Vent Fans. Provide information on the design change.
Licensee OIP open item 46	Implement a procedure to connect a 4160 VAC RRC DG to either of the A or B Train 1E 4160 VAC Buses on each unit to provide power for Phase 3. Provide the referenced procedure.
Licensee OIP open item 47	Develop procedures or FSGs for repower vital 4160 VAC Class IE buses from RRC FLEX 4KV DGs. Provide the referenced procedure.
Licensee OIP open item 49	Implement a design change to power containment dome and reactor cavity temperatures instrumentation from a vital 120 VAC instrument bus. Provide information on the referenced design change.
Licensee OIP open item 59	Develop procedures or FSGs that mimic the ERPIP-612 sections for SFP makeup and SFP spray. Provide the referenced procedure.
SFPI RAI 2	Describe the impact of the installation of the bulkhead gate on the reliability of the SFP level instrumentation for each SFP, and what compensatory measures would be taken to ensure reliable level indication in each SFP when the bulkhead gate is installed.
SFPI RAI 3	Provide additional information describing how the proposed arrangement of the conduit and routing of the cabling between the spent fuel and the location of the read-out/display device meet the guidance 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.

Audit Item Reference	Item Description
SE Review Item 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 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 power-operated relief valve (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 both will not 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.).
SE Review Item 2	(Timeline to reflux cooling) 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, 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 Review Item 3	Verify that appropriate human factors are applied for the implementation of the FLEX strategies.
SE Review Item 4	i. For the analyzed ELAP event, as applicable, please clarify the time at which isolation of SIT discharge MOVs would be necessary to ensure that nitrogen injection from the SITs into the RCS is prevented. ii. Please clarify whether the method for determining this time is based on the generic method for determining the SIT nitrogen injection pressure in Attachment 1 to the PWROG's interim core cooling position paper. If a different method is used, please provide justification for its adequacy. iii. For the analyzed ELAP event, please clarify the time at which power would be restored to SIT discharge MOVs. iv. If indications of imminent nitrogen injection from SIT tanks were observed by operators prior to restoration of power to the SIT discharge MOVs, please clarify whether ELAP mitigation procedures would instruct operators to increase the RCS pressure to forestall nitrogen injection until discharge MOVs could be isolated.

Part 3 – Specific Topics for Discussion:

1. Draft of Calvert Cliffs' 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 for Calvert Cliffs

Proposed Schedule

Onsite Day 1, Monday, September 8, 2014

1300 Check in at site:
Badging
Dosimetry and whole body count for RCA entrance

1430 Entrance meeting

1500 Licensee presentation of strategies

Onsite Day 2, Tuesday, September 9, 2014

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.

1230 Lunch

1330 Continue 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 3, Wednesday, September 10, 2014

0830 Check in at site; meet with Senior Resident/Resident

0900 NRC Audit Team Activities:

- Review documents relating to open or confirmatory items, RAIs, codes, analyses, etc.
- 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 4, Thursday, September 11, 2014

0830 Continue NRC Audit Team Activities

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 5, Friday, September 12, 2014*

0830 NRC Audit Team meeting

0900 NRC/Licensee pre-exit meeting

0930 NRC/Licensee exit meeting

1000 Audit closeout/departure

*The NRC will have its pre-exit and exit meetings with the licensee on Thursday, September 11, 2014, afternoon if the staff completes their activities Thursday morning.

If you have any questions, please contact me at 301-415-5888 or by e-mail at Jason.paige@nrc.gov.

Sincerely,

/RA by Stephen Monarque for/

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

Docket Nos.: 50-317 and 50-318

Enclosure:
Audit plan

cc w/encl: Distribution via Listserv

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NAME	JBowen (MHalter for)	JPaige (SMonarque for)		
DATE	08/04/14	08/05/14		

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