



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

July 8, 2014

Mr. Steven D. Capps  
Vice President – McGuire Site  
Duke Energy Carolinas, LLC  
McGuire Nuclear Station  
12700 Hagers Ferry Road  
Huntersville, NC 28078-8985

SUBJECT: WILLIAM B. MCGUIRE NUCLEAR STATION, UNITS 1 AND 2 - PLAN FOR THE ONSITE AUDIT REGARDING IMPLEMENTATION OF MITIGATING STRATEGIES AND RELIABLE SPENT FUEL POOL INSTRUMENTATION RELATED TO ORDERS EA-12-049 AND EA-12-051 (TAC NOS. MF1160, MF1161, MF1062, AND MF1063)

Dear Mr. Capps:

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. ML13063A185), Duke Energy Carolinas, LLC (the licensee) submitted its OIP for William B. McGuire Nuclear Station, Units 1 and 2 (MNS) in response to Order EA-12-049. By letters dated August 28, 2013, and February 27, 2014 (ADAMS Accession Nos. ML13254A204 and ML14073A462, 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 MNS interim staff evaluation (ISE) and audit report (ADAMS Accession No. ML13338A406) and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13086A095), the licensee submitted its OIP for MNS in response to Order EA-12-051. By letter dated June 13, 2013 (ADAMS Accession No. ML13157A097), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated July 11, 2013, August 26, 2013, and February 27, 2014 (ADAMS Accession Nos. ML13197A409, ML13242A009, ML14073A467, respectively), the licensee submitted its RAI responses and first two six-month updates to the OIP.

S. Capps

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The NRC staff's review to date led to the issuance of the MNS ISE and RAI dated October 28, 2013 (ADAMS Accession No. ML13281A791). 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. By letter dated April 10, 2014 (ADAMS Accession No. ML14097A426), the NRC staff issued an audit plan to the licensee for an audit of vendor information pertaining to Order EA-12-051.

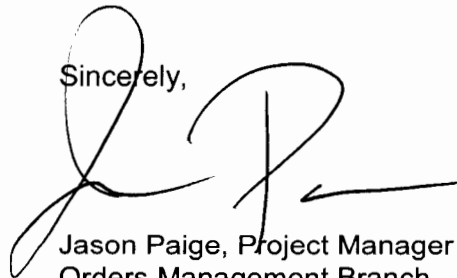
The ongoing audit process, to include the in-office and onsite portions, allows the staff to assess whether it has enough information to make a safety evaluation of the Integrated Plans. The audit allows the staff to review open and confirmatory items from the mitigation strategies ISE, RAI responses 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 MNS in accordance with the enclosed audit plan from August 4 - 7, 2014.

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

Sincerely,

A handwritten signature in black ink, appearing to read 'JP', with a horizontal line extending to the right from the end of the signature.

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

Docket Nos.: 50-369 and 50-370

Enclosure:  
Audit plan

cc w/encl: Distribution via Listserv

**Audit Plan**  
**William B. McGuire Nuclear Station, 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. ML13063A185), Duke Energy Carolinas, LLC (the licensee) submitted its OIP for William B. McGuire Nuclear Station, Units 1 and 2 (McGuire, MNS) in response to Order EA-12-049. By letters dated August 28, 2013, and February 27, 2014 (ADAMS Accession Nos. ML13254A204 and ML14073A462, 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). The purpose of the staff's audit is to determine the extent to which the licensees are proceeding on a path towards successful implementation of the actions needed to achieve full compliance with the order. This audit process led to the issuance of the MNS interim staff evaluation (ISE) and audit report (ADAMS Accession No. ML13338A406) and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13086A095), the licensee submitted its OIP for MNS in response to Order EA-12-051. By letter dated June 13, 2013 (ADAMS Accession No. ML13157A097), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated July 11, 2013, August 26, 2013, and February 27, 2014 (ADAMS Accession Nos. ML13197A409, ML13242A009, ML14073A467, 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 MNS ISE and RAI dated October 28, 2013 (ADAMS Accession No. ML13281A791). 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. By letter dated April 10, 2014 (ADAMS Accession No. ML14097A426), the NRC staff issued an audit plan to the licensee for an audit of vendor information pertaining to Order EA-12-051.

Enclosure

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

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

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

#### AUDIT SCOPE

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

The purpose of the audits is to obtain and review information responsive to the MNS 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 Spent Fuel Pool Instrumentation 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**

<b>Title</b>	<b>Team Member</b>
Team Lead	Daniel Merzke
Project Manager	Jason Paige
Technical Support	Joshua Miller
Technical Support	Garry Armstrong
Technical Support	Kerby Scales
Technical Support	Stephen Wyman

**NRC AUDIT TEAM – SUPPLEMENTAL MEMBERS**

<b>Title</b>	<b>Team Member</b>
Branch Chief	Sheena Whaley
Assistant Team Lead	Kevin Roche

**LOGISTICS**

The audit will be conducted onsite at MNS on August 4-7, 2014. Entrance and exit briefings will be held with the licensee at the beginning and end of the audit, respectively, as well as daily briefings of team activities. Additional details will be addressed over the phone. A more detailed schedule is provided below.

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

## DELIVERABLES

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

## INFORMATION NEEDS

- Materials/documentation provided in responses to open or confirmatory items and RAIs in the ISEs;
- OPD/FIP (current version), operator procedures, FLEX Support Guidelines (FSGs), operator training plans, RRC (SAFER) McGuire 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 EMI.

**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 RALs; 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.

<b>Audit Item Reference</b>	<b>Item Description</b>
ISE OI 3.2.1.8.A	The [Pressurized-Water Reactor Owners Group] PWROG submitted to NRC a position paper, dated August 15, 2013, which provides test data regarding boric acid mixing under single-phase natural circulation conditions and outlined applicability conditions intended to ensure that boric acid addition and mixing would occur under conditions similar to those for which boric acid mixing data is available. During the audit process, the licensee informed the NRC staff of its intent to abide by the generic approach discussed above. The licensee should address the clarifications in the NRC endorsement letter dated January 8, 2014 (ADAMS Accession No. ML13276A183)..
ISE CI 3.1.1.2.A AQ 4	Deployment of FLEX equipment - On page 57 of its Integrated Plan, in the chart identifying Pressurized Water Reactor (PWR) Portable Equipment Phase 2, the licensee lists (9) 9X12 trailers used to store and deploy power equipment, but does not list tow vehicles. Confirm abilities to move FLEX equipment and the level of protection afforded the means to move.

Audit Item Reference	Item Description
ISE CI 3.1.1.4.A	Off Site Resources, seismic – Confirm development of the MNS playbook as well as identification of the local Assembly Area and routes to the plant.
ISE CI 3.1.3.1.A AQ 12	Protection of FLEX equipment, high winds – Provide site specific data to justify the assumed tornado width of 1200 feet, which will be needed to confirm the final locations of the FLEX storage facilities conform to NEI 12-06 guidance.
ISE CI 3.1.5.2.A AQ 21	Deployment of FLEX equipment, high temperatures - Confirm that the storage facilities will be designed for extreme temperature ranges including concerns for expansion of sheet metal, swollen door seals, etc.
ISE CI 3.2.1.A	RCS Cooling and Heat Removal, and RCS Inventory Control Strategies - Justify the use of the analysis from Sections 5.2.1 and 5.2.2 of WCAP-17601-P by identifying and evaluating the important parameters and assumptions demonstrating that they are representative of MNS and appropriate for simulating the [Extended loss of alternating current (ac) power] ELAP transient.
ISE CI 3.2.1.1.A	Computer Code Used for ELAP Analysis – Confirm that 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	[Reactor Coolant Pump] RCP seals – Confirm that the RCP seal initial maximum leakage rate used in the analysis is greater than or equal to the upper bound expectation for the ELAP event (21 gpm/seal) discussed in the PWROG white paper addressing the RCP seal leakage for Westinghouse plants.
ISE CI 3.2.1.2.B	RCP seals - In some plant designs, such as those with 1200 to 1300 psia [steam generator] SG design pressures and no accumulator backing of the main steam system power-operated relief valve (PORV) actuators, the cold legs could experience temperatures as high as 580 degrees F° before cooldown commences. This is beyond the qualification temperature (550 degrees F°) of the O-rings used in the RCP seals. For those Westinghouse designs, a discussion of the information (including the applicable analysis and relevant seal leakage testing data) should be provided to justify that (1) the integrity of the associated O-rings will be maintained at the temperature conditions experienced during the ELAP event, and (2) the seal leakage rate of 21 gpm/seal used in the ELAP is acceptable.
ISE CI 3.2.1.3.A	Decay Heat - Values of the following key parameters used to determine the decay heat should be specified and the adequacy of the values evaluated: (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, if it's based on the beginning of the cycle, middle of the cycle, or end of the cycle.
ISE CI 3.2.1.4.A	Initial Values for Key Plant Parameters and Assumptions – Confirm results and appropriate actions subsequent to Westinghouse supplying MNS with additional information regarding the key plant parameters and assumptions.
ISE CI 3.2.1.7.A	Confirm that MNS will abide by the generic resolution for shutdown and refueling concerns.
ISE CI 3.2.4.4.A	Lighting and Communications - Confirmation will be required that upgrades to the site's communications systems have been completed.



Audit Item Reference	Item Description
ISE CI 3.2.4.6.A AQs 23, 50, & 51	Ventilation for Equipment Cooling and Personnel Habitability - Room heat up response for specific MNS areas are completed but need to be evaluated by NRC personnel. Confirm completion of evaluation and appropriate actions. Also, confirm ventilation for critical electrical components. Review turbine-driven auxiliary feedwater (TDAFW) Pump, Switchgear, Battery, and Control rooms.
ISE CI 3.2.4.8.A	Electrical Power Sources - Confirm completion of Flex Diesel Generator sizing calculation and appropriate actions.
ISE CI 3.2.4.9.A	Portable Equipment Fuel - Confirm completion of evaluation and appropriate actions to assess long-term FLEX equipment fuel oil requirements. Confirm that the licensee's guidance ensures that equipment will operate continuously without interruption.
ISE CI 3.2.4.10.A	Review [direct current] dc load shedding analysis/procedures and walkdown equipment. Perform walk-down of load shedding procedure with an Operator.
ISE CI 3.2.4.10.B	Load Reduction to Conserve DC Power - Confirm that ELAP procedures/guidance will direct operators to conserve dc power during the event by stripping nonessential loads as soon as practical.
ISE CI 3.4.A AQ 39	Off-Site Resources - Confirm NEI 12-06, Section 12.2 guidelines 2 through 10 are addressed with the RRC.
AQ 1	The licensee's plan did not provide sufficient information that large portable FLEX equipment items will be secured to protect them during a seismic event or provide that unsecured and/or non-seismic components do not damage the equipment during a seismic event as required by NEI-12-06, Section 5.3.1., Considerations 2 and 3. Provide additional information to demonstrate conformance to NEI 12-06, Section 5.3.1, Considerations 2 and 3.
AQ 2	The licensee's plan did not provide sufficient information that accessibility to at least one connection point of FLEX equipment is limited to seismically robust structures. This access includes both the connection point and any areas that plant operators will have to access to deploy or control the capability as required by NEI-12-06, Section 5.3.2., Consideration 2. The August 2013 update discussed seismic access to FLEX equipment but not to connection points. Provide additional information to demonstrate conformance to NEI 12-06, Section 5.3.2, Consideration 2.
AQ 3	The licensee's plan did not provide sufficient information that if power is required to move or deploy FLEX equipment (e.g., to open the door from a storage location), then power supplies should be provided as part of the FLEX deployment as required by NEI-12-06, Section 5.3.2., Consideration 4. Provide additional information to demonstrate conformance to NEI 12-06, Section 5.3.2, Consideration 4.
AQ 6	The integrated plan did not provide sufficient information that impacts are considered from large internal flooding sources that are not seismically robust and do not require ac power; are in other critical locations in addition to the auxiliary feedwater pump room and vicinity of the TDAFW pump; or are internally located in other than the auxiliary building or turbine building, as required by NEI 12-06, Section 5.3.3 Considerations 2 and 3. Provide additional information to demonstrate conformance to NEI 12-06, Section 5.3.3, Considerations 2 and 3.

Audit Item Reference	Item Description
AQ 7	Verify if a non-seismically robust downstream dam exists, per NEI 12-06, Section 5.3.3 Consideration 4. If so, verify that guidance will be developed to address the deployment of equipment impacted by failure of a non-seismically robust downstream dam as required by NEI 12-06, Section 5.3.3 Consideration 4.
AQ 8	The licensee's plan indicated that it relies on industry development of the RRCs to deploy FLEX equipment to a local assembly area, and on establishment of identified paths for FLEX equipment to end-point deployment areas within the site; however, consideration of event impacts on existing local infrastructure between the local assembly area and the site, outside of the owner controlled area, including the potential of soil liquefaction, is not specifically addressed. Provide additional information to demonstrate conformance to NEI 12-06, Section 5.3.4, Consideration 1, Section 6.2.3.4, Consideration 1, Section 7.3.4, Consideration 1, and Section 8.3.4.
AQ 9	NEI 12-06, Section 6, Assess External Flooding Impact, states, in part, the evaluation of external flood-induced challenges includes a determination of susceptibility to external flooding, a characterization of the applicable external flooding threat, and application of the flooding characterization to the protection and deployment of the strategies. In the licensee's integrated plan, the only statement characterizing the applicable external flooding threat in the Flooding Hazard Assessment was, "the limiting site flooding event for MNS is the Probable Maximum Precipitation (PMP) event, which is of limited duration and water level." Provide justification and additional information characterizing the analyzed flooding threat.
AQ 13	The licensee's plan did not include any information regarding early deployment or pre-staging of equipment prior to the anticipated arrival of a hurricane, as discussed in NEI 12-06, Section 7.3.2 Consideration 1. Provide additional information to demonstrate conformance to NEI 12-06, Section 7.3.2, Consideration 1.
AQ 15	The licensee's plan identified that transportation equipment will be provided to move the large skids/trailer-mounted equipment provided from off-site in Phase 3; however, the plan did not provide sufficient information that the ability to move equipment and restock supplies that may be hampered during a hurricane is being considered in plans for deployment of FLEX equipment as required by NEI-12-06, Section 7.3.2., Consideration 5. Provide additional information to demonstrate conformance to NEI 12-06, Section 7.3.2, Consideration 5.
AQ 17	The licensee's plan did not provide sufficient information that FLEX storage facilities will be designed for maximum snow and ice loading equivalent to ASCE 7-10, Minimum Design Loads for Buildings and Other Structures for the snow, ice, and cold conditions from the site's design basis as required by NEI-12-06, Section 8.3.1., Consideration 1. Specifically, the plan did not specify that the FLEX storage facilities would be designed to ASCE 7-10. Provide additional information to demonstrate conformance to NEI 12-06, Section 8.3.1.

Audit Item Reference	Item Description
AQ 18	The licensee's plan stated that equipment will be procured to function in the extreme conditions applicable to the site. However, no information was presented in the plan to indicate that consideration was also made for any manual operations required by plant personnel in such conditions. Provide additional information to demonstrate conformance to NEI 12-06, Section 8, Consideration 1.
AQ 33	The licensee's integrated plan did not identify whether additional strategies were needed to provide cooling functions for existing plant equipment or portable FLEX equipment to assure that coping strategy functionality could be maintained. Provide additional information to demonstrate conformance to NEI 12-06, Section 3.2.2, Guideline (3).
AQ 36	Provide information on the development of guidance and strategies with regard to the access to the Protected Area and internal locked areas. (NEI 12-06, Section 3.2.2, Guideline (9))
AQ 43	On Page 14 of the Integrated Plan, under PWR Installed Equipment Phase 1, the licensee discussed the auxiliary feedwater storage tank (CAST) being used as the source of water for the TDAFW pump as part of the strategy to maintain core cooling during ELAP events. The CAST is not described in the mitigation plan as being protected from missiles. Provide how the CAST will be protected from missiles as part of its mitigation strategy for ELAP events.
AQ 44	On Page 14 of the Integrated Plan, under PWR Installed Equipment Phase 1, the licensee discussed the use of TDAFW pump as part of the strategy to maintain core cooling during ELAP events. For tornado/hurricane force wind ELAP events, the licensee indicated that Lake Norman will be used to supply water to the TDAFW pump if the CAST is unavailable. As part of the open item being evaluated for the TDAFW pump, modifications will be made to automatically and manually align the TDAFW pump to Lake Norman. Provide details on how long it will take for the TDAFW pump to be automatically and/or manually aligned to Lake Norman during the tornado/hurricane ELAP events. For manually alignment, the staff requests that the licensee provide details on how this will be performed.
AQ 47	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 52	Provide Single Line Diagrams showing the proposed connections of Phase 2 and 3 electrical equipment on the e-Portal. Include breaker, relay (protection) and equipment rating information on the Single Line Diagrams.
Licensee OIP open item 5	Implement plant modification: Verify process connections.
Licensee OIP open item 7	Implement plant modification: Verify locations of the FLEX storage facilities.
Licensee OIP open item 14	A calculation will be performed to demonstrate that sufficient negative reactivity can be added through use of a pump and a reactor coolant system vent path to achieve xenon free cool down in accordance with the PWROG FSG guidelines. Verify the results of the final calculation.

<b>Audit Item Reference</b>	<b>Item Description</b>
Licensee OIP open item 15 AQ 54	Complete vital battery area room hydrogen accumulation calculation to determine if portable fans or HVAC units may be required, and timeframe for deployment. Verify if portable fans or HVAC units are needed in the vital battery area room.
Licensee OIP open item 26	The FLEX strategies and basis will be maintained in overall FLEX basis documents. Verify that the FLEX strategies and basis will be maintained in the overall FLEX basis documents.
SFPI RAI 2	Provide a description of the back-up instrument's required slope for the impulse tubing between the process zero reference point and the read-out/display; how the required slope is maintained in the proposed design; and why the distance between the back-up instrument's process zero reference point and the read-out/display is within the plant instrumentation design criteria.
SFPI RAI 3	Describe what precautions will be taken to ensure the back-up instrument's non-flowing sensing line does not become susceptible to freezing during cold outside temperatures.
SFPI RAI 4	Clarify if the back-up instrument contains a sealed capillary system and provide a description of what precautions will be taken to prevent crud build-up within the sensing line.
SFPI RAI 5	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 back-up SFP level sensor, and the proposed routing of the cables that will extend from the sensors toward the location of the read-out/display device.
SFPI RAI 8	Provide 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.

Audit Item Reference	Item Description
SE Review Item 1	<p>(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. Please provide the following information in regard to this topic:</p> <ul style="list-style-type: none"><li>a. Will the mitigating strategy include venting of the RCS?</li><li>b. If so, please provide the following information:<ul style="list-style-type: none"><li>i. The vent path to be used and the means for its opening and closure.</li><li>ii. The criteria for opening the vent path.</li><li>iii. The criteria for closing the vent path.</li><li>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.</li><li>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.</li><li>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.</li><li>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.</li></ul></li><li>c. If RCS venting will not be used, please provide the following information:<ul style="list-style-type: none"><li>i. The expected RCS temperature and pressure after the necessary quantity of borated makeup has been added to an unvented RCS.</li><li>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.).</li></ul></li></ul>

Audit Item Reference	Item Description
SE Review Item 2	(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, clarify whether the assumption of 21 gpm of seal leakage per RCP (at 550 degrees F, 2250 psia) remains valid in light of the issues identified in NSAL-14-1. In so doing, identify the specifics of the seal leak off line design and #1 seal faceplate material relative to the categories in NSAL-14-1 and identify the corresponding presumed leakage rate from NSAL-14-1 that is deemed applicable.
SE Review Item 4	(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.
SE Review Item 5	Provide an 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 Review Item 6	Verify that appropriate human factors are applied for the implementation of the FLEX strategies.

Part 3 – Specific Topics for Discussion:

1. Draft of MNS 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 MNS

### **Proposed Schedule**

#### **Onsite Day 1, Monday, August 4, 2014**

1430 Check in at site:  
Badging  
Dosimetry and whole body count for RCA entrance

1600 Entrance meeting

#### **Onsite Day 2, Tuesday, August 5, 2014**

0830 Licensee presentation of strategies

1230 Lunch

1330 NRC Audit Team Activities:

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

1600 NRC Audit Team meeting

1630 Team lead daily debrief/next day planning with licensee

#### **Onsite Day 3, Wednesday, August 6, 2014**

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

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

1200 Lunch

1300 Continue NRC Audit Team Activities

1600 NRC Audit Team meeting

1630 Team lead daily debrief/next day planning with licensee

#### **Onsite Day 4, Thursday, August 7, 2014**

0830 Continue NRC Audit Team Activities

- 1200 Lunch
- 1300 Continue NRC Audit Team Activities
- 1400 NRC Audit Team meeting
- 1500 NRC/Licensee pre-exit meeting
- 1530 NRC/Licensee exit meeting
- 1600 Audit closeout/departure



The NRC staff's review to date led to the issuance of the MNS ISE and RAI dated October 28, 2013 (ADAMS Accession No. ML13281A791). 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. By letter dated April 10, 2014 (ADAMS Accession No. ML14097A426), the NRC staff issued an audit plan to the licensee for an audit of vendor information pertaining to Order EA-12-051.

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 MNS in accordance with the enclosed audit plan from August 4 - 7, 2014.

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

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

Docket Nos.: 50-369 and 50-370

Enclosure:

Audit plan

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**ADAMS Accession No. ML14181B321**

\* via email

OFFICE	NRR/DIRS/IPAB	NRR/JLD/LA	NRR/JLD/JCBB/BC	NRR/JLD/JERB/BC
NAME	DMerzke	SLent	SBailey	SWhaley
DATE	07/02/14	07/01/14	07/07/14	07/08/14
OFFICE	NRR/JLD/JOMB/BC	NRR/JLD/JOMB/PM		
NAME	JBowen	JPaige		
DATE	07/08/14	07/08/14		

OFFICIAL AGENCY RECORD