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

September 15, 2014

Mr. Kelvin Henderson
Site Vice President
Duke Energy Carolinas, LLC
Catawba Nuclear Station
4800 Concord Road
York, SC 29745

SUBJECT: CATAWBA 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. MF1162, MF1163, MF1060, AND MF1061)

Dear Mr. Henderson:

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. ML13066A173), Duke Energy Carolinas, LLC (the licensee) submitted its OIP for Catawba Nuclear Station, Units 1 and 2 (CNS) in response to Order EA-12-049. By letters dated August 28, 2013, February 28, 2014 and August 28, 2014 (ADAMS Accession Nos. ML13298A010, ML14065A038, and ML14247A232, respectively), the licensee submitted its first three six-month updates to the OIP. By letter dated August 28, 2013 (ADAMS Accession No. ML13234A503), the NRC notified all licensees and construction permit holders that the staff is conducting audits of their responses to Order EA-12-049 in accordance with NRC Office of Nuclear Reactor Regulation (NRR) Office Instruction LIC-111, "Regulatory Audits" (ADAMS Accession No. ML082900195). This audit process led to the issuance of the CNS interim staff evaluation (ISE) and audit report (ADAMS Accession No. ML13364A175) 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 CNS in response to Order EA-12-051. By letter dated June 24, 2013 (ADAMS Accession No. ML13171A274), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated July 23, 2013, August 26, 2013, February 26, 2014, and August 14, 2014 (ADAMS Accession Nos. ML13206A384, ML13242A009, ML14063A279, and ML14227A717, respectively), the licensee submitted its RAI responses and first three six-month updates to the OIP.

The NRC staff's review to date led to the issuance of the CNS ISE and RAI dated October 28, 2013 (ADAMS Accession No. ML13281A562). 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 CNS in accordance with the enclosed audit plan from September 29 – October 3, 2014.

If you have any questions, please contact me at 301-415-2833 or by e-mail at Peter.Bamford@nrc.gov.

Sincerely,

Peter Bamford

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

Docket Nos.: 50-413 and 50-414

Enclosure:
Audit plan

cc w/encl: Distribution via Listserv

Audit Plan
Catawba 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. ML13066A173), Duke Energy Carolinas, LLC (the licensee) submitted its OIP for Catawba Nuclear Station, Units 1 and 2 (CNS, Catawba) in response to Order EA-12-049. By letters dated August 28, 2013, February 28, 2014 and August 28, 2014 (ADAMS Accession Nos. ML13298A010, ML14065A038, and ML14247A232, respectively), the licensee submitted its first three six-month updates to the OIP. By letter dated August 28, 2013 (ADAMS Accession No. ML13234A503), the NRC notified all licensees and construction permit holders that the staff is conducting audits of their responses to Order EA-12-049 in accordance with NRC Office of Nuclear Reactor Regulation (NRR) Office Instruction LIC-111, "Regulatory Audits" (ADAMS Accession No. ML082900195). 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 CNS interim staff evaluation (ISE) and audit report (ADAMS Accession No. ML13364A175) 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 CNS in response to Order EA-12-051. By letter dated June 24, 2013 (ADAMS Accession No. ML13171A274), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated July 23, 2013, August 26, 2013, February 26, 2014, and August 14, 2014 (ADAMS Accession Nos. ML13206A384, ML13242A009, ML14063A279, and ML14227A717, respectively), the licensee submitted its RAI responses and first three six-month updates to the OIP. The NRC staff's review to date led to the issuance of the CNS ISE and RAI dated October 28, 2013 (ADAMS Accession No. ML13281A562). 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 (SFPI) ISE, the licensee's integrated plans, and other audit questions. Additionally, the staff gains a better understanding of submitted information, identifies additional information necessary for the licensee to supplement its plan, and identifies any staff potential concerns. The audit's onsite portion will occur prior to declarations of compliance for the first unit at each site.

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

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

AUDIT SCOPE

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

The purpose of the audits is to obtain and review information responsive to the CNS 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

Title	Team Member
Team Lead and Project Manager	Peter Bamford
Technical Support	Bruce Heida
Technical Support	Joshua Miller
Technical Support	Khoi Nguyen
Technical Support	Duc Nguyen
Technical Support	Kerby Scales

LOGISTICS

The audit will be conducted onsite at CNS on September 29 – October 3, 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) Catawba Response Plan; and

- Materials/documentation for staff audit questions and/or licensee OIP identified open items as listed in the Part 2 table below

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

Part 1 - Overall Mitigating Strategies and Program Review:

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

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

WALK-THROUGH LIST:

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

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

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

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

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

6. Walk-through of communications enhancements.

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

Part 2 – Specific Technical Review Items:

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

Audit Item Reference	Item Description
OI 3.1.2.2.A	Resolve the conflict between the need to pump the TDAFW [Turbine Driven Auxiliary Feedwater] pump pit before submergence at 6 hours and deploying generators to power the sump pumps by 8 hours.
OI 3.2.1.8.A	Core Sub-Criticality - Confirm resolution of the generic concern associated with the modeling of the timing and uniformity of the mixing of a liquid boric acid solution injected into the reactor coolant system under natural circulation conditions potentially involving two-phase flow.
CI 3.1.1.2.A	Seismic Deployment (applicable to all hazards deployment) - since a final location for the building has been selected, formal evaluation of potential deployment routes and concerns such as soil liquefaction can proceed. Confirm attributes of deployment routes, including liquefaction potential.
CI 3.1.1.3.A	Procedural Interfaces – Seismic – Confirm completion of evaluation of potential internal Aux Building flooding and appropriate actions and procurement of sump pumps.
CI 3.2.1.1.A	Reliance on the NOTRUMP code for the ELAP [extended loss of alternating current power] 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. Confirm that the NOTRUMP code is used within the accepted limits.
CI 3.2.1.3.A	Westinghouse will be assisting CNS in providing further information regarding decay heat modeling. Evaluate for applicability and implementation.

Audit Item Reference	Item Description
CI 3.2.4.1.A	Room temperature analyses being performed will provide a better idea of the environmental conditions expected during the event. Confirm completion of analyses and appropriate actions.
CI 3.2.4.3.A	Evaluations to address the needs for freeze protection are in progress. Confirm completion of evaluations and appropriate actions.
CI 3.2.4.4.A	Confirm evaluations for additional lighting have been completed (licensee's open item 45 and 59), and appropriate actions taken.
CI 3.2.4.4.B	Confirm upgrades to the site's communication systems have been completed.
CI 3.4.A	Offsite Resources - Confirm NEI 12-06 Section 12.2, Guidelines 2 through 10, are addressed with SAFER.
AQ.24	Catawba-24. Section 3.1 of WCAP-17601 discusses the PWROG's [pressurized water reactor owners group's] recommendations that cover the following subjects for consideration in developing FLEX mitigation strategies (1) initiation of cooldown, (2) development of inventory copying time, (3) instrumentation required for attaining core cooling, (4) sub-criticality study, (5) maintaining adequate shutdown margin by various sources, (6) the use of safe shutdown (SSD) low leakage seal, (7) feedwater interruption times, (8) feeding a single steam generator (SG), (9) prevention of nitrogen injection from accumulators, and (10) cooldown limits on SGs. List the recommendations that are applicable to the plant, provide rationale for the applicability, address how the applicable recommendations are considered in the ELAP analysis and discuss the plan to implement the recommendation. Also, provide rationale for each of the recommendations that are determined to be not applicable to the plant.
AQ.37	Catawba-37 NEI 12-06, Section 3.2.2, Consideration (6) states, in part: Plant procedures/guidance should identify loads that need to be stripped from the plant dc buses (both Class 1E and non-Class 1E) for the purpose of conserving dc power. In the integrated plan Sequence of Events, the licensee describes necessary load reductions by two and three hours. Provide following additional information: a) Provide the direct current (dc) load profile with the required loads for the mitigating strategies to maintain core cooling, containment, and spent fuel pool cooling; b) Provide a detailed discussion on the loads that will be shed from the dc bus, the equipment location (or location where the required action needs to be taken), and the required operator actions needed to be performed and the time to complete each action. In your response, explain which functions are lost as a result of shedding each load and discuss any impact on defense in depth and redundancy; and c) Provide the basis for the minimum dc bus voltage that is required to ensure proper operation of all required electrical equipment.
AQ.44	Licensee indicates analysis was performed indicating containment design pressure would not be exceeded prior to 72 hours. Please provide the calculation for NRC review.
AQ.45	In the Integrated Plan, there are no instruments specified which will provide the operators with the temperature inside the containment, only the pressure. Excessive temperatures could result in a loss of containment integrity due to the failure of containment penetration seals or other portions of the containment boundary. Furthermore, excessive temperatures could result in the failure of necessary measurement instruments located in the containment. Please provide a discussion and the technical basis for concluding that the temperature inside containment will not need to be monitored to inform the operators of the potential to exceed the limits of penetration seals or other equipment.
AQ.46	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.47	Provide a summary of the sizing calculation for the FLEX generators to show that they can supply the loads assumed in phases 2 and 3.
AQ.49	Provide information on the adequacy of the ventilation provided in the battery room to protect the batteries from the effects of extreme high and low temperatures.
AQ.50	Describe plans for supplying fuel oil to FLEX equipment (i.e., fuel oil storage tank volume, supply pathway, etc.). Also, explain how fuel quality will be assured if stored for extended periods of time.

Audit Item Reference	Item Description
AQ.51	Provide a discussion of battery room ventilation to prevent hydrogen accumulation while recharging the batteries in phase 2 or 3. In your response, include a description of the exhaust path if it is different from the design basis.
AQ.52	Provide electrical Single Line Diagrams showing the proposed connections of Phase 2 and 3 electrical equipment to permanent plant equipment. This may be done on the e-Portal. Show protection information (breaker, relay etc.) and rating of the equipment on the Single Line Diagrams.
AQ.54	MESB-BOP-2: Discuss any safety consequences of performing a load shed on the dc busses, to include the strategy to prevent an uncontrolled hydrogen gas release from the main generator if the backup seal oil pump is to be shed.
OIP.1	Disconnect all non-critical loads from vital batteries. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 25 in PIP [Problem Investigation Process] C-12-2291.
OIP.5	Align charging to Channel A and D Vital Batteries. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 29 in PIP C-12-2291.
OIP.6	Align portable injection pump from Refueling Water Storage Tank to Safety Injection System to provide Reactor Coolant System makeup and boration. Approximate time suggested by PWROG to provide negative reactivity addition and maintain margin to criticality. Site specific analysis will need to be performed to establish actual time. See Corrective Action 30 in PIP C-12-2291.
OIP.7	Align portable injection pump from Refueling Water Storage Tank to Safety Injection System to provide Reactor Coolant System makeup and boration. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 31 in PIP C-12-2291.
OIP.8	Provide portable lighting (beyond head and hand lamps and installed battery lighting). Activity to be validated in conjunction with associated procedure changes. See Corrective Action 32 in PIP C-12-2291.
OIP.9	Install portable fans in Control Room and Battery Rooms. Time based on engineering judgment. Analysis will determine the need and timing for ventilation. See Corrective Action 33 in PIP C-12-2291.
OIP.15	Re-power Hydrogen igniters. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 39 in PIP C-12-2291.
OIP.16	Align charging to Channel B and C Vital Batteries. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 40 in PIP C-12-2291.
OIP.17	Isolate the Cold Leg Accumulators. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 41 in PIP C-12-2291.
OIP.21	Align portable diesel driven Hale Pump to Containment Spray connection. Contingency to be available if required to reduce Containment temperature. Modification of an existing B.5.b Strategy. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 45 in PIP C-12-2291.
OIP.22	Align RRC diesel generator to power installed Containment Spray pumps. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 46 in PIP C-12-2291
OIP.25	Develop adequate procedural and administrative guidance to implement mitigation strategies and supporting activities during Phase 1, 2, and 3. See Corrective Action 49 in PIP C-12-2291.
OIP.26	Provide S/G Makeup via CA TDP with static RC/RN suction supply - Procedural guidelines and ECR 6139 and 6140. See Corrective Action 7 and 19 in PIP C-12-2291.
OIP.28	Add appropriate FLEX equipment to the site Periodic Maintenance (PM) program. See Corrective Action 50 in PIP C-12-2291.
OIP.29	Develop a Document for the FLEX program. See Corrective Action 51 in PIP C-12-2291.
OIP.31	Develop applicable training programs to support the FLEX strategies and supporting activities. Training will be provided once programs are in place. Corrective Action 53 in PIP C- 12-2291 has been closed to the Needs and Evaluation Database (NED). NED 13-02758 has been initiated and assigned for processing.

Audit Item Reference	Item Description
OIP.32	Develop flow model calculations to support the various FLEX strategies and document the available static water volume in the RN/CA piping (PIP C-1 2-2291 CA 20).
OIP.35	Provide MCC [Motor Control Center] cable plug in connections for various loads (ECR 6047 and 6048). See Corrective Action 75 and 76 in PIP C-12-2291.
OIP.36	Provide primary and alternate RCS makeup and injection connections (ECR 5983 and 5984). See Corrective Action 15 and 16 in PIP C-12-2291.
OIP.37	Purchase high pressure and low pressure RCS injection pumps. See Corrective Action 54 in PIP C-12-2291.
OIP.43	Provide redundant SFP Level Instruments per NRC Order -EC109413 and 109414.
OIP.44	Determine lighting requirements via Corrective Action 31 in PIP C-11-6867.
OIP.45	Determine lighting requirements and implement as needed via Corrective Action 24 in PIP C-12-2291.
OIP.47	Ensure that an appropriate inventory of portable hand-held satellite phones, spare batteries, and chargers, is available for use by the Emergency Response Organization. See Corrective Action 7 in PIP C-12-2195.
OIP.49	Ensure that portable communications equipment (i.e., satellite phones, radios, and diesel generators) are stored in a manner such that maximizes survivability from applicable external events per NEI 12-01, Section 4.5. Corrective Action 9 in PIP C-12-2195.
OIP.50	Ensure that programmatic controls are established for communications equipment (i.e., portable satellite phones, radios, small generators) to ensure availability and reliability, including the performance of periodic inventory checks and operability testing per NEI 12-01, Section 4.8. Also, provide training on the locations and use of communications systems and equipment (NEI 12-01, Section 4.11). Corrective Action 10 in PIP C-12-2195.
OIP.53	Provide additional portable FLEX equipment such as pumps, air compressors, and generators to be purchased with specific identifiers/labels maintained in the Equipment Data Base (EDB). See Corrective Action 59 in PIP C-12-2291.
OIP.54	Develop periodic surveillance procedures and Operator rounds to verify that all FLEX equipment is in its proper storage location and not degraded. See Corrective Action 60 in PIP C-12-2291.
OIP.56	Complete staffing studies and ensure adequate personnel will be available to support the FLEX mitigation strategies and associated activities. See Corrective Action 7 in PIP C-12- 4953.
OIP.57	Develop procedural guidelines to use handheld instruments tied into local in plant components to monitor essential parameters. See Corrective Action 62 in PIP C-12-2291.
OIP.58	Develop procedural guidelines to disconnect normal power supplies and attach alternate power cables from disconnect devices and portable generators for select components. See Corrective Action 63 in PIP C-12-2291.
OIP.59	Develop procedural guidelines to deploy and install lighting in required areas. See Corrective Action 24 in PIP C-12-2291.
OIP.61	Determine if Mobile Boration will be required from the RRC during Phase 3. See Corrective Action 65 in PIP C-12-2291.
OIP.62	Determine if portable lighting will be required from the RRC during Phase 3. See Corrective Action 66 in PIP C-12-2291.
OIP.64	Determine Phase 3 requirements related to Radiation Protection Equipment. See Corrective Action 68 in PIP C-12-2291.
OIP.65	Determine Phase 3 requirements related to Commodities such as food and water. See Corrective Action 69 in PIP C-12-2291.
OIP.71	Obtain and store any additional equipment in FLEX Storage Facilities or Category I buildings needed to aid in the connection of the RRC equipment to plant components. See Corrective Action 74 in PIP C-12-2291.

Audit Item Reference	Item Description
OIP.74	Document seismic qualification (robustness in accordance with NEI 12-06) of assured RN to KF make up piping on Unit 1. See Corrective Action 87 in PIP C-12-2291.
OIP.75	Add new FWST low/high pressure borated water injection pump suction connection. See Corrective Action 83 and 84 in PIP C-12-2291 (ECR-6787 and ECR-6788)
OIP.76	Evaluate travel paths into the Auxiliary Building through non seismic structures. See Corrective Action 88 in PIP C-12-2291.
OIP.80	The number of Steam Generators and [power-operated relief valves] PORVs required for the Low Pressure portable pump makeup FLEX strategy needs to be validated and formally documented in a Catawba station calculation. See Corrective Action 92 in PIP C-12-2291.
OIP.83	Station controlled documents need to be created to capture vendor reports related to generator machine capabilities to power the designated FLEX loads in Phase 2 and 3. See Corrective Action 95 in PIP C-12-2291.
SFPI RAI. 1	Please confirm that 597 ft. 6 in. is the correct elevation provided for Level 1.
SFPI RAI. 2	Please provide a clearly labeled sketch or marked-up plant drawing of the plan view of the SFP area, depicting the SFP inside dimensions, the planned locations/placement of the primary and 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. 3	Please provide additional information describing how the final arrangement of the SFP instrumentation and routing of the cabling between the level instruments, the electronics and the displays, meets the Order requirement to arrange the SFP level instrument channels in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the SFP. If applicable, please describe what precautions will be taken to ensure the back-up instrument's sensing line slope requirements will be maintained and that it does not become susceptible to freezing during cold outside temperatures. Also describe the arrangement provisions regarding how the back-up transmitter will be accessible for periodic calibration and maintenance.
SFPI RAI. 4	Please provide the following: a) The design criteria that will be used to estimate the total loading on the mounting device(s), including static weight loads and dynamic loads. Describe the methodology that will be used to estimate the total loading, inclusive of design basis maximum seismic loads and the hydrodynamic loads that could result from pool sloshing or other effects that could accompany such seismic forces. b) A description of the manner in which the level sensor (and stilling well, if appropriate) will be attached to the refueling floor and/or other support structures for each planned point of attachment of the probe assembly. Indicate in a schematic the portions of the level sensor that will serve as points of attachment for mechanical/mounting or electrical connections. For the backup pressure transmitter describe the sensing line and transmitter attachments to plant structures. c) A description of the manner by which the mechanical connections will attach the level instrument to permanent SFP structures so as to support the level sensor assembly.
SFPI RAI. 5	For RAI 4(a) above, please 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
SFPI RAI. 6	For each of the mounting attachments required to attach SFP Level equipment to plant structures, please describe the design inputs, and the methodology that was used to qualify the structural integrity of the affected structures/equipment.
SFPI RAI. 7	Please provide the following: a) A description of the specific method or combination of methods you intend to apply to demonstrate the reliability of the permanently installed equipment under BDB ambient temperature, humidity, shock, vibration, and radiation conditions. b) A description of the testing and/or analyses that will be conducted to provide assurance that the equipment will perform reliably under the worst-case credible design basis loading at the location where the equipment will be mounted. Include a discussion of this seismic reliability demonstration as it applies to a) the level sensor mounted in the SFP area, and b) any control boxes, electronics, or read-out and re-transmitting devices that will be employed to convey the level information from the level sensor to the plant operators or emergency responders. c) A description of the specific method or combination of methods that will be used to confirm the reliability of the permanently installed equipment such that following a seismic event the instrument will maintain its required accuracy.
SFPI RAI. 8	For RAI #7 above, please provide the results for the selected methods, tests and analyses used to demonstrate the qualification and reliability of the installed equipment in accordance with the Order requirements.
SFPI RAI. 9	Please provide the following: a) A description of how the two channels of the proposed level measurement system meet this requirement [independence] so that the potential for a common cause event to adversely affect both channels is minimized to the extent practicable. b) Further information on how each level measurement system, consisting of level sensor electronics, cabling, and readout devices will be designed and installed to address independence through the application and selection of independent power sources, the use of physical and spatial separation, independence of signals sent to the location(s) of the readout devices, and the independence of the displays.
SFPI RAI. 10	Please provide the following: a) A description of the electrical ac power sources and capabilities for the primary and backup channels. b) Please provide the results of the calculation depicting the battery backup duty cycle requirements demonstrating that its capacity is sufficient to maintain the level indication function until offsite resource availability is reasonably assured.

Audit Item Reference	Item Description
SFPI RAI. 11	Please provide the following: a) An estimate of the expected instrument channel accuracy performance under both (a) normal SFP level conditions (approximately Level 1 or higher) and (b) at the BDB conditions (i.e., radiation, temperature, humidity, post-seismic and post- shock conditions) that would be present if the SFP level were at the Level 2 and Level 3 datum points. b) A description of the methodology that will be used for determining the maximum allowed deviation from the instrument channel design accuracy that will be employed under normal operating conditions as an acceptance criterion for a calibration procedure to flag to operators and to technicians that the channel requires adjustment to within the normal condition design accuracy.
SFPI RAI. 12	Please provide the following: a) A description of the capability and provisions the proposed level sensing equipment will have to enable periodic testing and calibration, including how this capability enables the equipment to be tested in-situ. b) A description of how such testing and calibration will enable the conduct of regular channel checks of each independent channel against the other, and against any other permanently-installed SFP level instrumentation. c) A description of how functional checks will be performed, and the frequency at which they will be conducted. Describe how calibration tests will be performed, and the frequency at which they will be conducted. Provide a discussion as to how these surveillances will be incorporated into the plant surveillance program. d) A description of what preventive maintenance tasks are required to be performed during normal operation, and the planned maximum surveillance interval that is necessary to ensure that the channels are fully conditioned to accurately and reliably perform their functions when needed.
SFPI RAI. 13	Please provide the following: a) The specific location for the primary and backup instrument channel display. b) For any SFP level instrumentation displays located outside the main control room, please describe the evaluation used to validate that the display location can be accessed without unreasonable delay following a BDB event. Include the time available for personnel to access the display as credited in the evaluation, as well as the actual time (e.g., based on walk-throughs) that it will take for personnel to access the display. Additionally, please include a description of the radiological and environmental conditions on the paths personnel might take. Describe whether the display location remains habitable for radiological, heat and humidity, and other environmental conditions following a BDB event. Describe whether personnel are continuously stationed at the display or monitor the display periodically.

Audit Item Reference	Item Description
SFPI RAI. 14	Please provide a list of the procedures addressing operation (both normal and abnormal response), calibration, test, maintenance, and inspection procedures that will be developed for use of the spent SFP instrumentation. The licensee is requested to include a brief description of the specific technical objectives to be achieved within each procedure.
SFPI RAI. 15	Please provide the following: a) Further information describing the maintenance and testing program the licensee will establish and implement to ensure that regular testing and calibration is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. Please include a description of the plans for ensuring that necessary channel checks, functional tests, periodic calibration, and maintenance will be conducted for the level measurement system and its supporting equipment. b) Information describing compensatory actions when both channels are out-of-order, and the implementation procedures. c) Additional information describing expedited and compensatory actions in the maintenance procedure to address when one of the instrument channels cannot be restored to functional status within 90 days.

Audit Item Reference	Item Description
SE.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 PORV is to be used for RCS venting, please clarify whether the associated block valve would be available (or the timeline by which it could be repowered) in the case that the PORV were to stick open. If applicable, please further explain why opening the pressurizer PORV is justified under ELAP conditions if the associated block valve would not be available. vii. If a pressurizer PORV is to be used for RCS venting, please clarify whether FLEX RCS makeup pumps and FLEX steam generator makeup pumps will both be available prior to opening the PORV. If they will not both be available, please provide justification. b. If RCS venting will not be used, please provide the following information: i. The expected RCS temperature and pressure after the necessary quantity of borated makeup has been added to an unvented RCS. ii. Adequate justification that the potential impacts of unvented makeup will not adversely affect the proposed mitigating strategy (e.g., FLEX pump discharge pressures will not be challenged, plant will not reach water solid condition, adequate boric acid can be injected, increased RCS leakage will not adversely affect the integrated plan timeline, etc.).
SE.2	(Westinghouse Standard RCP [Reactor Coolant Pump] 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 [gallons per minute] may not be a conservative leakage rate for ELAP analysis. This value had been previously used in the ELAP analysis referenced by many Westinghouse PWRs, including the generic reference analysis in WCAP-17601-P. Therefore, please clarify whether the assumption of 21 gpm of seal leakage per RCP (at 550 degrees F, 2250 psia) remains valid in light of the issues identified in NSAL-14-1. In so doing, please identify the specifics of the seal leak off line design and #1 seal faceplate material relative to the categories in NSAL-14-1 and identify the corresponding leakage rate from NSAL-14-1 or other associated documents (e.g., PWROG-14027) that is deemed applicable. If plant modifications will be undertaken to move the plant to a more favorable category relative to seal leakage, please identify the applicable modifications and discuss the associated completion timeline.

Audit Item Reference	Item Description
SE.3	Please provide adequate justification for the seal leakage rates calculated according to the Westinghouse seal leakage model that was revised following the issuance of NSAL-14-1. The justification should include a discussion of the following factors: a. benchmarking of the seal leakage model against relevant data from tests or operating events, b. discussion of the impact on the seal leakage rate due to fluid temperatures greater than 550°F resulting in increased deflection at the seal interface, c. clarification whether the second-stage reactor coolant pump seal would remain closed under ELAP conditions predicted by the revised seal leakage model and a technical basis to support the determination, and, d. justification that the interpolation scheme used to compute the integrated leakage from the reactor coolant pump seals from a limited number of computer simulations (e.g., three) is realistic or conservative.
SE.4	The NRC staff understands that Westinghouse has recently recalculated seal leakoff line pressures under loss of seal cooling events based on a revised seal leakage model and additional design-specific information for certain plants. Please clarify whether the piping in your seal leakoff line is capable of withstanding the pressure predicted during an ELAP event according to the revised seal leakage model. If not, please discuss any planned modifications to the seal leakoff piping design and the associated completion timeline. Alternately, please clarify that the seal leakage rate would remain in an acceptable range if the affected seal leakoff piping were to rupture.
SE.5	(ELAP Calculations with NOTRUMP) Please provide adequate basis that calculations performed with the NOTRUMP code (e.g., those in WCAP-17601-P, WCAP-17792-P) are adequate to demonstrate that criteria associated with the analysis of an ELAP event (e.g., avoidance of reflux cooling, promotion of boric acid mixing) are satisfied. NRC staff confirmatory analysis suggests that the need for implementing certain mitigating strategies for providing core cooling and adequate shutdown margin may occur sooner than predicted in NOTRUMP simulations.
SE.6	(Timeline to reflux cooling) Please clarify whether the intended timeline for aligning the FLEX RCS makeup pump may be delayed based on procedural guidance that derives from the analysis in WCAP-17792-P, pages 3-10 through 3-16. Although the staff recognizes that plant operators require leeway to control pumps and equipment in response to plant indications and other symptoms, the staff considers it prudent that equipment alignments proceed as outlined in the integrated plan to the extent possible. Therefore, please provide justification if the operators would delay the alignment of the FLEX RCS makeup pump(s) beyond the time specified in the integrated plan based on initial indications that the reactor coolant pump seal leakage is lower than the value assumed in the ELAP analysis.
SE.7	Verify that appropriate human factors are applied for the implementation of the FLEX strategies.
SE.8	RCS cooling & RCS inventory control - Specify which analysis performed in WCAP-17601 is being applied to Catawba. Additionally, justify the use of that analysis by identifying and evaluating the important parameters and assumptions demonstrating that they are representative of Catawba and appropriate for simulating the ELAP transient.

Part 3 – Specific Topics for Discussion:

1. Draft of CNS 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 CNS

Proposed Schedule

Onsite Day 1, Monday, September 29, 2014

1400 Check in at site:
Badging
Dosimetry and whole body count for RCA entrance

1500 Entrance meeting

1515 Finish badging, if necessary

1615 NRC Audit Team meeting

1630 Team lead daily debrief/next day planning with licensee

Onsite Day 2, Tuesday, September 30, 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, October 1, 2014

0830 Check in at site; meet with Senior Resident/Resident (time may change based on availability)

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, October 2, 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/pre-exit meeting

Onsite Day 5, Friday, October 3, 2014

0900 NRC/Licensee exit meeting

1000 Audit closeout/departure

The NRC staff's review to date led to the issuance of the CNS ISE and RAI dated October 28, 2013 (ADAMS Accession No. ML13281A562). 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 CNS in accordance with the enclosed audit plan from September 29 – October 3, 2014.

If you have any questions, please contact me at 301-415-2833 or by e-mail at Peter.Bamford@nrc.gov.

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

Docket Nos.: 50-413 and 50-414
Enclosure: Audit plan
cc w/encl: Distribution via Listserv

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OFFICE	NRR/JLD/JOMB/PM	NRR/JLD/LA	NRR/JLD/JCBB/BC	NRR/JLD/JERB/BC
NAME	PBamford	SLent	SBailey	BPham
DATE	09/09/14	09/10/14	09/10/14	09/11/14
OFFICE	NRR/JLD/JOMB/BC	NRR/JLD/JOMB/PM		
NAME	MHalter	PBamford		
DATE	09/15/14	09/15/14		

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